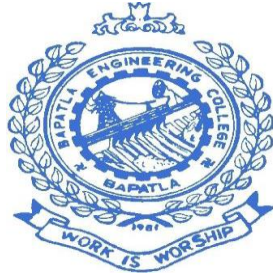# Bapatla Engineering College
(*Autonomous*)
BAPATLA

ACADEMIC RULES & REGULATIONS and SYLLABUS
(R18 REGULATIONS)

HAND BOOK
(2019-2020)

First & Second Year B.Tech.

Bapatla Engineering College:: Bapatla
(Autonomous under Acharya Nagarjuna University)
(Sponsored by Bapatla Education Society)
BAPATLA-522102, Guntur District, A.P.
www.becbapatla.ac.in

Vision & Mission of the College

Vision:

To build centers of excellence, impart high quality education and instill high standards of ethics and professionalism through strategic efforts of our dedicated staff, which allows the college to effectively adapt to the ever changing aspects of education.

To empower the faculty and students with the knowledge, skills and innovative thinking to facilitate discovery in numerous existing and yet to be discovered fields of engineering, technology and interdisciplinary endeavors.

Mission:

Our mission is to impart the quality education at par with global standards to the students from all over India and in particular those from the local and rural areas. We continuously try to maintain high standards so as to make them technologically competent and ethically strong individuals who shall be able to improve the quality of life and economy of our country.

Profile of the College

Year of Start	1981
Courses offered	**B.Tech.:** 1. Civil Engineering (CE), 2. Computer Science & Engineering (CSE), 3. Electronics & Communication Engineering (ECE), 4. Electrical & Electronics Engineering (EEE), 5. Electronics & Instrumentation Engineering (EIE), 6. Information Technology (IT), 7. Mechanical Engineering (ME) **M.Tech.:** 1. CE (Structural Engineering), 2. ME (CAD/CAM), 3. ECE (Communication Engineering & Signal Processing), 4. EEE (Power Systems Engineering) & 5. C.S.E. **Master of Computer Applications (MCA)** **M.Sc**.: Mathematics, Physics, Electronics, Chemistry (Organic & Analytical) & Computer Science
Accredited by NBA in the years	07.05.2003 (CE, CSE, ECE, EEE, EIE, ME) 16.03.2007 (CH, CE, CSE, ECE, EEE, EIE, IT & ME) 04.01.2013 (CH, CE, CSE, ECE, EEE, EIE & ME)
Autonomous Status	2010
Accredited by NAAC	2015
Research Park	Innovation Centres: 1) Kuka Robotic Technology Centre 2) Bosch Rexroth Centre of Competence in Automation Technologies 3) Siemens Centre of Excellence 4)Industry Institute Interaction Cell 5) Centre for Continuing Education 6) Incubation Skill Development Cell
Library	Titles: 28,323; Books: 75,317, Journals: International Online-523, Print-30, National Print-90, Educational CDs- 3,237; No. of Staff: 8
Sports facilities	Cricket, Basket Ball, Volley Ball, Ball Badminton, Hockey, Tennis, Foot Ball, Table Tennis, Chess, Caroms & Weight Lifting, Weight Training
Area	30 Acres; Built-up Area: 56102 Sq.mt.
Awards	Best Library (2011, 14, 18), Best laboratory (2009, 10, 11), Best UG Performance College (2011, 12) ,Best Eco Friendly Campus (2016) from Acharya Nagarjuna University
CISCO	A two-way interactive CISCO Digital Media System that is first of its kind in the South Asia Pacific Region at a cost of Rs.3 Crores
Placement/Training	No. of Students placed in 2018-19: 450, No. of Companies visited: 50
Students Activities	Suryodhaya Society for Awakening Community **(SAC)** for social service, Centre for Creative Arts **(CCA)** for cultural & arts and **AWAAZ** the literary club with the main motto of nurturing the inherent talents in the students.
NCC / NSS	NCC (Army wing) unit with 50 cadets. Training will be given by the P.I. Staff from 1(A) Engr. Coy, Guntur. NSS with 300 volunteers.
Facilities	Hostel for girls, Food court, Own Transport, 24x7 power supply, Mineral water, Bank, Post Office

ABOUT THE BAPATLA EDUCATION SOCIETY

BAPATLA EDUCATION SOCIETY was established in the year 1962 registered No: 58/1962 under societies act XXI of 1860 with the objectives to found and run the Educational & Cultural Institutions.

Distinguished Office Bearers of the Society:

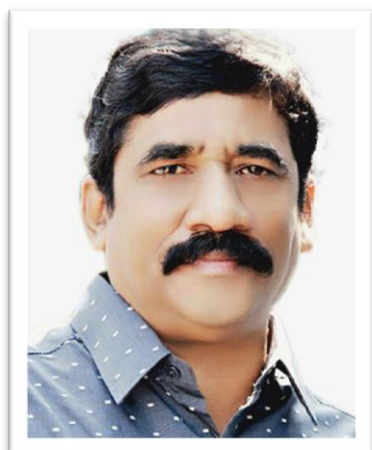Sri M. Seshagiri Rao
President

Sri Paladugu Paparao
Vice President-1

Sri Burle Venkata Siva Rama Krishna
Vice President-2

Sri Manam Nageswara Rao
Secretary

Sri Panguluri Bhavannarayana Chowdary
Jt. Secretary & Correspondent

Sri Chandrapati Venkaiah
Treasurer

The management members are imbued with a spirit of selfless service and believe in the principle of Academic autonomy. Transparency of all financial transactions is strictly adhered and all payments and receipts are through bank transactions only. The Management obtains objective feedback about all aspects of the college and suitably advises and motivates employees in a discrete manner. As a mark of commitment to good management, rules and regulations are applied with justice and fair play. Above all, the management makes all out effort to provide healthy environment on the campus. (Lawns, Greenery including 1000 neem trees and CC roads provided)

MESSAGE FROM PRINCIPAL

Dr. V. Damodara Naidu
B.TECH. (Mech.), M.TECH. (Prod), IIT-Kgp, PH.D., JNTUH

A warm welcome to NAAC accredited Bapatla Engineering College (BEC). The Bapatla Engineering College (Autonomous), one of the seven educational institutions sponsored by the Bapatla Education Society, was established in 1981 with a vision to impart quality technical education and is affiliated to Acharya Nagarjuna University. The College is credited with beautifully laid out and thoughtfully designed. The college has well qualified faculty members from IITs, NITs and reputed universities and has 63 doctorates and more than 60 faculty pursuing Doctorate degrees.

The college is one of the first generation self-financed engineering colleges started in the year 1981 and is regarded as one of the best engineering colleges in the state of Andhra Pradesh.

The teaching learning process in the campus is meticulously planned and effectively implemented by the Heads of the Departments with the able support of the staff members. Continuous evaluation backed by remedial classes, student counseling and parent interactions, form the nucleus of the teaching learning process.

The college is chosen by several world renowned leaders such as Bosch Rexroth Center of Competence in Automation Technologies, Siemens Center of Excellence and Kuka Robotic Technology Center to have their centers of research and innovation under one roof in a unique Research Park established at a cost of Rs.20 Crores.

BEC has taken the class room teaching to world class level through the two-way interactive Digital Media System. We are member of Indian Society for Technical Education (ISTE), Computer Society of India (CSI) etc. Various workshops, seminars, conferences, and Faculty Development Programs (FDP) are conducted through ISTE, and add-on courses and several skill development programs are being organized by the college.

The Department of Training and Placement facilitates the maximum employment opportunities to all the deserving candidates of final and pre-final year students. Many of our Alumni are decorating the top positions at many reputed Multi-National Companies.

We always look at the employability skills and try to perfectly match with the requirements of the Industry. We impart training in Technical Skills and Life Skills (Soft Skills) as a part of our curriculum to mould and shape the personalities and make the students employable. In order to shape the life skills (soft skills), we are imparting regular training internally and through external resources as well.

We emphasize mainly on Assessment and Evaluation, analyzing the training needs of each candidate, and provide Career Guidance and Counseling. The college provides Training on Business English Communication Skills, Aptitude, Domain skills as needed by the Industry. We promote industrial visits and knowledge sessions to make students familiar with industrial practices. The college encourages students to pursue internships to gain work experience in industries and increase their employability. EDP Cell conducts various programs to develop entrepreneurship culture among students. Over 50 companies visited our college, and more than 65% of eligible students have been placed in various reputed companies for the academic year 2018-19. The students of the college continuously excel in national and international competitive examinations like GATE, IELTS, GRE and TOEFL. We have several Industry MoUs which will help to train faculty and students on latest trends in the technology. Some of the MOUS are listed below:

1.	NASSCOM, Delhi.	CSE/IT
2.	New Mexican State University, NEW Mexico, USA.	All Depts.
3.	Acer Engineers Private Limited, Hyderabad.	Civil Engg.
4.	ICT Academy, Chennai	All Depts.
5.	Caddy Code Solutions Pvt Ltd., Bangalore	IT
6.	APHRDI, Govt. of AP	All Depts.
7.	Sri Lakshmi Ganapathi Engineering Works (to be signed), Tenali.	Mech. Engg.
8.	Satyam Ventures Engineering Services Private Limited, Hyderabad (to be signed)	Mech. Engg.
9.	Construction Industry Development Council, Delhi	Civil Engg.
10.	Microlink Peripheral Controls Pvt. Ltd., Vijayawada	ECE
11.	SRC E-Solutions, Vijayawada	ECE
12.	BT & BT Management consultancy Pvt. Limited. (to be signed)	All Depts.

The college is enriched with Centre for Innovation Incubation and Entrepreneurship (CIIE) and well-established library with Digital Library facility that caters to the needs of student. The institution is a hub of Student clubs that helps them to gratify their creative and innovative minds and weaving social responsibility with leadership qualities among students. The college also provides amenities like subsidized transportation, food court, mineral water, internet, Bank, Post office, Ladies Hostel and Dispensary equipped with an ambulance for the convenience of faculty, staff and students.

We have Governing body (Autonomous), College Academic Council for the continuous improvement of academic performance. We have formed several Committees for Grievance and Redressal, Examination, Admission, Library, Student Welfare, Internal Complaints, Extra-Curricular Activities, Academic Audit, Disciplinary, Research, Sports, Training and Placement, Alumni Affairs, Anti-Ragging, Campus Facilities, and Maintenance under Planning and Evaluation Committee.

We wish all the students to utilize the infrastructure and the experienced faculty of our institution to equip themselves with emerging technologies and innovative skills that make them lead the nation in to new heights of advancement and development to enrich every citizen's life.

Heads of Departments

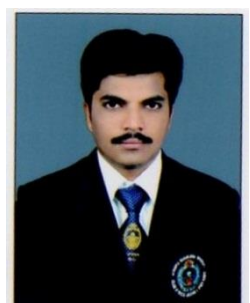|					
Dr. J. S. Rao Head, Chemical Engg. & COE	Dr. Naga Satish Head, Civil Engineering	Dr. Shaik Nazeer Head, CSE	Dr. B. Chandra Mohan, Head, ECE	Dr. N. Rama Devi Head, EEE	Prof. Ch. Ramesh Head, EIE
Prof. N. Siva Rama Prasad Head, IT	Dr. T Nancharaiah Head, Mechanical Engg.	Dr. P. Vijaya Saradhi Head, Mathematics	Dr. K. Rama Krishna Head, Physics	Dr. V. Madhava Rao Head, Chemistry	Dr. P. AshaMadhavi Head, English
Mr. K.N. Prasad Head, MCA	Mr. A. Rama Mohana Rao Librarian	Mr. Justin Chako Head, Placements	Dr.T.Chandrasekhara Rao, Warden, Campus Hostel	Mr. Meeravali Shaik Physical Director	Mr. D. Gopala Krishna Office Superintendent

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

Academic Rules & Regulations for B. Tech Program
(Approved by Academic Council & Governing Body of the College held on August 2018)

(Amended in August 2019; Effective for students admitted into First year B.Tech from the academic year 2018-2019 onwards – R18 Regulations).

1.0 EXTENT: All the rules and regulations, specified herein after, shall be read as a whole for the purpose of interpretation and when a doubt arises, the interpretation of the Chairman, Academic Council, Bapatla Engineering College (Autonomous) is final. As per the requirements of the Statutory Bodies, The Principal, Bapatla Engineering College (Autonomous), shall be the Chairman of the College Academic Council.

> **1.1 DURATION OF THE PROGRAMME AND MEDIUM OF INSTRUCTION:** The duration of the B.Tech. Programme is for four academic years consisting of two semesters in each academic year. The medium of instruction and examinations is English.

2.0 ADMISSIONS:

2.1 Admission into the First year of any Four Year B.Tech. Programmes of study in Engineering: Admissions into the first year of B.Tech. Programme of Bapatla Engineering College (Autonomous) (*Subsequently referred to as* **B.E.C**) will be as per the norms stipulated by the Govt. of Andhra Pradesh from time to time.

2.2 Admission into the Second year of any Four year B.Tech. Programmes of study in Engineering as Lateral Entry Student**:** Admissions into the second year of B.Tech. Programme of B.E.C will be as per the norms stipulated by the Govt. of Andhra Pradesh from time to time.

2.3 Admissions with advance standing: These may arise in the following cases:

1) When a student seeks transfer from other colleges to B.E.C and intends to pursue B.Tech at B.E.C in an eligible branch of study.

2) When students of B.E.C get transferred from one regulation to another regulation or from previous curriculum to revised curriculum.

3) When a student, after long discontinuity, rejoins the college to complete his/her Programme of study for the award of the degree.

These admissions may be permitted by the Academic Council of B.E.C as per the norms stipulated by the statutory bodies and the Govt. of Andhra Pradesh from time to time. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained and the Programme of study at B.E.C will be governed by the transitory regulations stipulated in *4.3.3 and 4.3.4.*

3.0 Details of the Program:

S.No	Activity	Description
1.	Number of Semesters in an Academic Year	Two
2.	Course Work	15 Weeks. 90 instructional days.
3.	Evaluation	As per the Assessment and Examination Policy.

4.0 Programmes of study in B.Tech:

4.1   The Four year B.Tech Programme is offered in the following branches of study:

S.No.	Title of the UG Programme	Abbreviation
1.	Civil Engineering	CE
2.	Computer Science & Engineering	CS
3.	Electrical & Electronics Engineering	EE
4.	Electronics & Communication Engineering	EC
5.	Electronics & Instrumentation Engineering	EI
6.	Information Technology	IT
7.	Mechanical Engineering	ME

4.2   Structure of the Programme:

As per the Program Review Policy & AICTE model curriculum guidelines.

4.3   **Transitory Regulations**: For students admitted under advance standing (mentioned in 2.3) these transitory regulations will provide the *modus operandi*.

At the time of such admission, based on the Programme pursued (case by case)

1) Equivalent courses completed by the student are established by the BOS concerned.
2) Marks/Credits are transferred for all such equivalent courses and treated as successfully cleared in the Programme of study prescribed by the concerned BOS.
3) A Programme chart of residual courses not cleared will be derived and a Programme of study with duration specified will be prescribed for pursuit at B.E.C.
4) Marks obtained in the previous system, if the case be, are converted to grades and CGPA is calculated accordingly.

All other modalities and regulations governing shall be the same as those applicable to the stream of students with whom such a candidate is included into.

4.4 Curriculum for each Programme of study:

1) The Four year curriculum of any B.Tech Programme of study in any branch of engineering is formulated based on the guidelines mentioned in 4.2 and will be recommended by the Board of Studies concerned and is approved by the Academic council of the college.
2) In the case of students admitted through lateral entry, the respective regular curriculum from the second year onwards is to be pursued by such students. Foundation courses may be added if necessary.
3) In the case of students admitted under advanced standing, the equivalency will be prepared by the Department Committee and to be approved by the Board of Studies concerned and the Academic Council.
4) After approval from the Academic Council, Department informs the courses to be taken by all the students along with the academic regulations.

Table below shows a typical curriculum frame work for B.Tech Degree program.

S.No.	Subject Area	Average no. of credits
1.	Humanities & Social Sciences courses	12 - 14
2.	Basic Science Courses	21 – 28
3.	Engineering Science	18 - 21
4.	Professional Core courses	65 – 78
5.	Professional Elective Courses	15 - 21
6.	Open Electives	6 – 12
7.	Major Project / Seminar, etc	12
8.	MOOCs	2
9.	Summer Internship	2
10.	Mandatory courses (2 courses)*	0
	TOTAL	165 - 170

The students admitted through the **Lateral Entry scheme** have to complete **125 – 130** credits.

*For mandatory courses as suggested by UGC / AICTE no credits are allocated but obtaining pass grade in these subjects is compulsory to obtain degree.

4.5 The Maximum duration permitted to pursue the programme and cancellation of admission:

4.5.1 The maximum duration permitted for any student to successfully complete any four year B.Tech. Programme of study shall be:

1) Eight academic years in sequence from the year of admission for a normal student admitted into the first year of any Programme,
2) Six academic years in sequence from the year of admission for a Lateral entry student admitted into the second year of any Programme, and
3) For students admitted with advanced standing, the maximum time for completion of Programme study shall be twice the period in terms of academic years in sequence, stipulated in the Programme curriculum defined at the time of admission.

4.5.2 In case, any student fails to meet the applicable conditions for the eligibility of degree in the maximum stipulated period as mentioned in *4.5.1*, his/her admission stands cancelled and no degree will be awarded.

5.0 EXAMINATION& EVALUATION:

The performance of the students in each semester shall be assessed course wise. All assessments will be done on absolute mark basis. However, for the purpose of reporting the performance of a candidate, letter grades and grade points will be awarded as per section *9.1.*

EVALUATION:

The performance of the students in each semester shall be assessed course wise. All assessments will be done on absolute mark basis. However, for the purpose of reporting the performance of a candidate, letter grades and grade points will be awarded. The performance of a student in each course is assessed with alternate assessment methods, term examinations on a continuous basis during the semester called Continuous Internal Evaluation (CIE) and a Semester End Examination (SEE) conducted at the end of the semester. For each theory, design and/or drawing course, there shall be a comprehensive Semester End Examination (SEE) of three hours duration at the end of each Semester, except where stated otherwise in the detailed Scheme of Instruction.

The distribution of marks between Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) to be conducted at the end of the semester will be as follows:

Nature of the Course	CIE	SEE
Theory subjects	50	50
Drawing	50	50
Practical	50	50
Term Paper	50	50
Project work	75	75

5.1 Continuous Internal Evaluation (CIE) in Theory and Drawing subjects:

In each Semester there shall be two Term examinations and some *Alternate Assessment Tools (AAT)* like Home Assignment, Class Test, Problem Solving, Group Discussion, Quiz, Seminar and Field Study in every theory course. The Alternate Assessment Tools with detailed modality of evaluation for each course shall be finalized by the teacher concerned before beginning of the course. It will be reviewed and approved by the Department Committee.

The Term Examination is conducted in the regular mode according to a schedule which will be common for a particular year of study. The maximum weightage for Term Examinations, AATs and the calculation of marks for CIE in a theory course is given in the following table.

Particulars	Term Exams (Max. 20 marks)	AAT (Max. 30 marks)
Better Performed exam	75% of marks obtained	Continuous assessment by teacher as per the predetermined course delivery & assessment plan. (Min. two assessments)
Other exam	25% of marks obtained	

A minimum of 25 (50%) marks are to be secured exclusively in the Continuous Internal Evaluation (CIE) in order to be declared as passed in that course and eligible to write the SEE of that course.

Semester End Examination (SEE) in Theory, Design and/or Drawing course:

a) For each theory, design and/or drawing course, there shall be a comprehensive Semester End Examination (SEE) of three hours duration at the end of each Semester for 50 marks, except where stated otherwise in the detailed Scheme of Instruction. Question paper setting shall be set by the teacher or teachers together in a multi section courses and to be verified as described in policy document.

b) A minimum of 20 (40%) marks are to be secured exclusively in the Semester End Examination (SEE) of theory, design and/or drawing course in order to be declared as passed in that course and for the award of the grade in the course.

5.3 Continuous Internal Evaluation (CIE) in laboratory courses:

The evaluation for Laboratory course is based on CIE and SEE. The CIE for 50 marks comprises of 20 marks for day to day laboratory work, 15 marks for record submission and 15 marks for a laboratory examination at the end of the semester.

In any semester, a minimum of 90 percent of prescribed number of experiments / exercises specified in the syllabi for laboratory course shall be taken up by the students. They shall

complete these experiments / exercises in all respects and get the record certified by the internal lab teacher concerned and the Head of the Department concerned to be eligible to appear for the Final Examination in that laboratory course.

A minimum of 25 (50%) marks are to be secured exclusively in the Continuous Internal Evaluation (CIE) in order to be declared as passed in that lab course and eligible to write the SEE of that lab course.

5.4 Semester End Examination (SEE) in laboratory courses:

a) For each laboratory course, the Semester End Examination (SEE) shall be conducted by one internal and one external examiner appointed by the Principal and the duration of the exam shall be for three hours. The SEE is for 50 marks which include 10 marks for write up, 20 marks for lab experiment/exercise, 15 marks for Viva-voce and 5 marks for general impression.

b) A minimum of 20 (40%) marks shall be obtained in SEE of a laboratory course in order to be declared as passed and for the award of the grade in that laboratory course.

5.5 Evaluation of Term Paper:

a) A term paper is to be submitted by each student in the 7th semester which would be a precursor to the project work to be done in the 8th semester. The evaluation is based on CIE for 50 marks, which includes a minimum of two seminars/presentations for 20 marks and the report submitted at the end of the semester which is evaluated for 30 marks.

b) A minimum of 25 (50%) marks are to be secured exclusively in the Continuous Internal Evaluation (CIE) in order to be declared as passed in the Term Paper and eligible to write the SEE in the Term Paper.

c) The Semester End Examination (SEE) shall be conducted for 50 marks by one internal and one external examiner appointed by the Principal. The SEE contains Viva-voce and the demonstration of the model developed or work performed as a part of the term paper.

d) A minimum of 20 (40%) marks shall be obtained in SEE of the term paper in order to be declared as passed and for the award of the grade in the term paper.

5.6 Evaluation of the Project

a) In case of the Project work, the evaluation shall be based on CIE and SEE. The CIE for 50 marks consists of a minimum of two Seminars / presentations for 20 marks and the Project Report submitted at the end of the semester which is evaluated for 30 marks.

b) A minimum of 25 (50%) marks are to be secured exclusively in the Continuous Internal Evaluation (CIE) in order to be declared as passed in the Project Work and eligible to write the SEE in the Project Work.

c) SEE shall be evaluated in the form of a Viva- voce and the demonstration of the thesis work for 100 marks. Viva-voce Examination in Project Work shall be conducted by one internal examiner and one external examiner to be appointed by the Principal.

d) A minimum of 40 marks shall be obtained in SEE exclusively in order to be declared as passed in the Project and for the award of the grade.

NOTE : A student who is absent for any Test / Exam / Seminar / Presentation as a part of Continuous Internal Evaluation (CIE), for any reason whatsoever, shall be deemed to have scored zero marks in the respective component and no provision for make-up shall be provided.

5.7 Course Repetition (Repeater course)

The students not qualified to write SEE in a course may register for the repeater courses through course repetition and summer semester. The students have to apply to the Principal through the respective HOD by paying prescribed fees.

Course repetition: A student can take up a maximum of two theory courses in a semester immediately after the semester end examinations of that particular semester in accordance with the guidelines recommended by the Academic Council. The students who are not taking regular semester courses may additionally register for one more theory course.

Summer semester: Further the students can register maximum three (theory + lab courses together) courses in the summer semester. Summer semester courses shall be of both even & odd semesters. Summer semester shall be conducted immediately after completion of even semester end examinations.

The HODs concerned have to allot a teacher related to that course to conduct class work. The minimum number of periods to be conducted should not be less than 75% of the total prescribed periods for that course. The classes will be conducted in the vacation period or in the weekends or in the afternoons as decided by the HOD concerned. Teacher has to evaluate the student for his performance in CIE as per the autonomous norms and the qualified students should appear for a semester end examination. The pass criteria in both CIE & SEE should be as per autonomous norms.

The documents for monitoring the candidates registered for course repetition are available with the Heads of the Departments and Exam Section.

6.0   ATTENDANCE REGULATIONS:

All students shall maintain a minimum attendance of 75% in each course registered. The attendance percentage is computed by considering total number of periods conducted in a course as the denominator and the total number of periods actually attended by the student in that course, as the numerator.

In case of shortfall in this, the Principal of the College shall consider and may condone deficiency up to a limit of 10% in special cases for reasons such as medical emergencies, participation in sport, cultural activities, seminars, workshops and paper presentation etc. at the level of University, State, and National after due recommendation by the concerned Head of the Department.

For the above cases student must take prior permission from the head of the department to participate in such events and in case of medical emergencies intimation should be given immediately and submit the medical certificate to the concerned Head of the Department. Any student failing to meet the above standard of attendance in any course(s) registered, shall not be allowed to appear for SEE of such course(s). The student seeking condonence of attendance on the above grounds has to pay the condonence fee as specified by the college.

Further a student, who could not satisfy the minimum attendance of average 75% in all the courses put together (or 65% in special cases as mentioned above) in any semester, is not eligible to appear for the Semester End examinations and shall have to repeat that semester in the subsequent year.

6.1 Attendance at CIE and SEE: Attendance at all examinations, both CIE and SEE of each course registered shall be compulsory for the students and there shall not be any provision for re-examinations/consideration.

6.2 Any student against whom any disciplinary action by the College is imposed shall not be permitted to attend any SEE in that Semester.

6.3 The basis for the calculation of the attendance shall be the period prescribed by the College by its calendar of events. For the first semester students, the same is reckoned from the date of admission to the course.

6.4 The students shall be informed about their attendance position periodically by the College so that the students can strive to make up the shortage. However, non-receipt of such information from the college will not be considered as valid reason for exemption from the attendance requirements.

6.5 If a student does not fulfil the attendance requirements in any subject, he/she is not permitted to attend the Semester End Examination in that subject and is deemed to have been awarded "F' grade in that subject.

7.0   DETENTION: A student is said to have been detained and not allowed to appear for Semester End Examination (SEE) at the end of the semester when

7.1   The student does not have a minimum average 75% attendance or 65% attendance with condonation in all subjects put together in that semester.

7.2   Such a student shall have to repeat the same semester subsequently and satisfy the above requirements afresh to become eligible to appear for the Semester End Examination (SEE), conducted at the end of the semester.

8.0   CONDITIONS FOR PROMOTION:

8.1   A student not detained in the first semester of a year of study shall be promoted to second semester of that year of study.

8.2   A student shall be eligible for promotion to III semester of B.Tech. Programme, if he/she is not detained in the second semester (of first year B.Tech. Programme) irrespective of the number of backlog courses (in terms of credits not earned) in I year B.Tech. (i.e. I & II semesters together).

8.3   A student shall be eligible for promotion to V semster of B.Tech. Programme, if he/she is not detained in the IV semester and also must secure 50% of the credits of the subjects (including laboratory courses, MOOC courses etc as per curriculum) that have been studied in I & II semesters irrespective of whether the candidate takes the end examination or not as per the normal course of study. At the time of commencement of class work for the V semester, student must secure the required credits.

8.4   A student shall be eligible for promotion to VII semester of B.Tech. Programme, if he/she is not detained in the VI semester of B.Tech. Programme and also must secure 50% of the credits of the subjects (including laboratory courses, MOOC courses etc as per curriculum) that have been studied upto IV semester. At the time of commencement of class work for the VII semester, student must secure the required credits.

And in case of getting detained for shortage of earned credits as per above, the student may make up the credits through supplementary exams for the failed courses before the date of commencement of class work for V or VII semester respectively.

7.0   Reregistration of not qualified courses in CIE for lack of attendance or lack of marks:

Students who failed to secure minimum attendance (75%) and minimum percentage of marks (50%) in CIE specified in any course, he / she will not be allowed to write SEE of that course. Such students have to register and qualify in CIE for those courses through course repletion and summer semester.

Students, who failed after final regular examination (SEE), must appear for the supplementary examinations to be conducted as per the college examination schedule.

Registration: Every eligible student has to register himself / herself at the beginning of every semester indicating all the Courses taken up for pursuit by him / her during that Semester and mentor's signature is mandatory.

8.1 When a student is debarred for one or more semesters, his / her registration in the present semester is cancelled and the student is debarred from registering in future during the debarred period.

8.2 In any case, while re-registering in any semester, he or she will have to pay the requisite fee once again.
For extended years of study, students must pay the tuition fees as per the college regulations.

9.0 GRADING SYSTEM

Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester for each course.

Letter Grades: A letter grade is basically a qualitative measure (an alphabet/letter) giving the performance of a student, such as,

Performance	Grade
Extraordinary	A+
Excellent	A
Very Good	B+
Good	B
Average	C
Pass	P
Unsatisfactory/Fail	F

The above grades are based on the marks obtained by the student in both CIE and SEE.

9.1 Grade Points

Depending on the letter grades assigned, a student earns certain grade points. The Colleges follow the 10-point grading system, as given below for absolute grading system.

The letter grades and the corresponding grade points are as given in the Table.

Table: Grades & Grade Points

Grade	Grade Points	% of Marks
A+	10	≥90% – 100%
A	9	≥80% –< 90%
B+	8	≥70% – <80%
B	7	≥60% – <70%
C	6	≥50% –< 60%
P	5	≥45% – <50%
F(Fail)	0	< 45%

9.1.1 The grade points given in above tables help in the evaluation of credit points earned by the student in a Course as the credit points are equal to the number of credits assigned to the Course multiplied by the grade points awarded to the student in that Course. This shall be used in arriving at the Semester Grade Point Average (SGPA) of the student for that semester, as it is the sum of all the credit points earned by the student for all the Courses registered in that semester.

9.1.2 Earning of Credit: A student shall be considered to have completed a Course successfully and earned the credits if he/she secures an acceptable letter grade in the range A+ to P. Letter grade 'F' in any Course implies failure of the student in that Course and no credits earned.

9.2 A student who earns a minimum of 5 grade points (P grade) in a course is declared to have successfully completed the course, and is deemed to have earned the credits assigned to that course.

However it should be noted that a pass in any course/term paper/Project shall be governed by the rules mentioned Assessment and Examination Policy.

10.0 GRADE POINT AVERAGE

10.1 The Grade Point Average (GPA) will be calculated according to the formula:

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where C_i = number of credits for the course i,

G_i = grade points obtained by the student in the course.

10.2 Semester Grade Point Average (SGPA) is awarded to candidates considering all the courses of the semester. Zero grade points are also included in this computation.

10.3 To arrive at Cumulative Grade Point Average (CGPA), the formula is used considering the student's performance in all the courses taken in all the semesters completed up to that particular point of time.

10.4 Example

Semester	Course Code.	Credits	Grade	Grade Point	Credit Points	SGPA	CGPA
III	18EC301	3	C	6	18		
III	18EC302	3	B	7	21		
III	18EC303	3	A	9	27		
III	18EC304	4	P	5	20		
III	18EC305	4	C	6	24		
III	18EC306	2	B+	8	16	**6.72** **(148/22)**	**6.72** **(148/22)**
III	18ECL301	1	P	5	5		
III	18ECL302	1	B	7	7		
III	18ECL303	1	A+	10	10		
Total		**22**			**148**		
IV	18EC401	3	P	5	15		
IV	18EC402	3	B	7	21		
IV	18EC403	4	A+	10	40		
IV	18EC404	4	C	6	24		
IV	18EC405	2	A	9	18	**7.40** **(163/22)**	**7.06** **(311/44)**
IV	18EC406	3	B+	8	24		
IV	18ECL401	1	P	5	5		
IV	18ECL402	1	C	6	6		
IV	18ECL403	1	A+	10	10		
Total		**22**			**163**		

11.0 ELIGIBILITY FOR AWARD OF B.TECH. DEGREE: A student shall be eligible for award of the B.Tech degree if he/she fulfils all the following conditions:

1) Registered and successfully completed all the components prescribed in the Programme of study to which he/she is admitted
2) Obtained CGPA greater than or equal to 6.0 (Minimum requirements for Pass)
3) Has no dues to the Institute, hostels, Libraries, NCC/NSS etc., and
4) No disciplinary action is pending against him/her

12.0 AWARD OF CLASS: A candidate who becomes eligible for the award of B.Tech. Degree shall be placed in one of the following Classes based on CGPA.

Table: CGPA required for award of Degree

Distinction	≥ 8.0*
First Class	≥ 6.5 < 8.0
Second Class	≥ 5.5 < 6.5
Pass Class	< 5.5

* In addition to the required CGPA of 8.0, the student must have necessarily passed all the courses of every semester **in the minimum stipulated period for the Programme**.

\# If the student did not obtain a CGPA of 6.0 after completing all courses of study, he/she should repeat some courses and obtain higher grade till his/her CGPA is 6.0. Unless he/she obtains a CGPA of 6.0, degree will not be awarded.

12.1 Grade Sheet: A grade sheet (Memorandum) will be issued to each student indicating his performance in all courses taken in that semester and also indicating the Grades and SGPA.

12.2 Transcripts: After successful completion of the total Programme of study, a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee. Partial transcript will also be issued up to any point of study to any student on request and by paying the stipulated fee in force.

12.3 The Academic council of the College approves and recommends the same to Acharya Nagarjuna University for the award of a degree to any student.

13.0 IMPROVEMENT OF CLASS:

13.1 A candidate, after becoming eligible for the award of the Degree, may reappear for the Final Examination in any of the theory courses as and when conducted, for the purpose of improving the class. But this reappearance shall be only once and within a period of two academic years after becoming eligible for the award of the Degree.
However, this facility shall not be availed by a candidate who has taken the Original Degree Certificate. Candidates shall not be permitted to reappear either for CIE in any course or for Semester End Examination (SEE) in laboratory courses (including Project Viva-voce) for the purpose of improvement.

14.0 SUPPLEMENTARY EXAMINATIONS: In addition to the Regular Final Examinations held at the end of each semester, Supplementary Final Examinations will be conducted during the academic year. Candidates taking the Regular / Supplementary examinations as Supplementary candidates may have to take more than one Final Examination per day.

15.0 INSTANT SUPPLEMENTARY EXAMINATIONS: Candidates who fail in one theory course of VIII semester can appear for Instant Supplementary Examination conducted after declaration of the revaluation results of the said exam.

16.0 MALPRACTICES:

The Principal shall refer the cases of malpractices in Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) to an Enquiry Committee constituted by him / her. The Committee will submit a report on the malpractice allegedly committed by the student to the Principal. The Principal along with the members of the Committee is authorized to award a punishment as per the norms, if the student is found guilty.

16.1 To prevent the students indulging in Malpractices through latest electronic gadgets such as Cell-phones, Pagers, Organizer PDAs and Palmtops in addition to chits, printed material etc. in the examination halls, students shall be thoroughly checked at the main entrance as well as in the examination halls by the invigilators. The senior staff members appointed as internal flying squad has greater and decisive role to play in this regard.

16.2 A notice displaying the 'SCALE OF PUNISHMENT' shall prominently be displayed at the Main Entrance to the Examination Halls, preferably near the 'Seating Plan Display'.

16.3 If any student is found resorting to malpractice, the matter shall immediately be brought to the notice of Chief/Additional chief superintendent, Flying squad by the invigilator concerned.

16.4 The above staff members will then prepare a detailed report on the spot in proforma-I (copy enclosed) of the case. The full details of the offence and the details of supporting material must be written in establishing the case. The residential addresses of the students involved in malpractice shall be noted with contact telephone numbers in the malpractice report.

16.5 A written statement is to be obtained from the candidate. If any candidate refuses to give the written statement, the same shall be recorded by the invigilator with the signature of another invigilator as witness.

16.6 Whatever be the supporting material for establishing the case of malpractice, the same are to be confiscated immediately for sending the same to the Malpractices prosecuting committee as a proof.

16.7 The supporting materials so confiscated shall be signed by the chief superintendent and flying squad/invigilator and shall be attached and tagged properly to the scripts of the malpractice cases and are to be sent toMalpractices prosecuting committeealong with the report (proforma enclosed).

16.8 Any representation to relax the punishment will not be entertained by Malpractices prosecuting committee.

16.9 The answer scripts of the candidates who resorted to mal-practice shall be packed in a separate sealed cover duly subscribing on the cover as "MAL-PRACTICE" and send the same to Malpractices prosecuting committee.

16.10 Any student who is arrogant and does not follow the examination rules shall be sent out of the examination hall after collecting his question paper and answer book. Complaints on such cases shall be lodged to the Principal irrespective of imposter is an examinee or an outsider.

SCALE OF PUNISHMENT FOR MAL-PRACTICE CASES

Rule No.	Nature of Offence	Scale of Punishment
01	Writing unparliamentary / vulgar / obscene / words or Language in the answer book. OR Refusing to obey instructions of Chief Superintendent / Invigilator.	The performance of the candidates in that subject shall be cancelled. Further the case should be referred to the disciplinary committee by Chief Superintendent / Malpractices prosecuting committee. If the student repeat the same offence, the performance of the candidate in the semester examination in ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) shall be cancelled
02	A candidate found in possession of any relevant material pertaining to the day of examination such as Papers, Books, Notes OR Notes written on any part of the clothes dressed by the candidate or any part of his/her body or any part of Table or Desk; OR Foot rule, instruments like setsquare, protractor, calculator, mobile phones, etc., with notes written on them. OR Mass copying at the examination centre detected during the conduct of examination or during valuation.	The candidate is to be sent out of the examination hall immediately after obtaining his/her written explanation and duly confiscating his/her Hall-ticket. He/she shall be allowed to appear for the remaining subjects in that examination by obtaining duplicate hall ticket. The performance of the candidates in that subject shall be cancelled. Further depending on severity of offence or reoccurrence of the offence by the student, the Malpractices prosecuting committee may impose the cancellation of performance of the candidate in two or more or ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) in that semester examination.
03	A candidate found having copied or indulging in copying from any paper, book or notes or any other source or allowed or is found allowing any other candidate to	The candidate is to be sent out of the examination hall immediately after obtaining his/her written explanation and duly confiscating his/her Hall-ticket. He/she shall be allowed to appear for the remaining subjects in that examination by

	copy any matter from his/her answer book or to have in any manner rendered any assistance to another candidate, or if he/she is found to have been receiving assistance from another candidate. OR Destruction or suppression of the evidence of the forbidden material in any way like swallowing, tearing or throwing outside etc.	obtaining duplicate hall ticket. The performance of the candidates in that subject shall be cancelled. Further depending on severity of offence or reoccurrence of the offence by the student, the Malpractices prosecuting committee may impose the cancellation of performance of the candidate in two or more or ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) in that semester examination.
04	Copying detected on the basis of internal evidence such as during valuation/special scrutiny	The performance of the candidates in that subject shall be cancelled. Further depending on severity of offence or reoccurrence of the offence by the student, the Malpractices prosecuting committee may impose the cancellation of performance of the candidate in two or more or ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) in that semester examination. Note for MPC: "The Malpractice Prosecuting Committee which awards the punishment to the candidates involved in the malpractice has to make sure of the involvement of the Candidate/s in the offence before any punishment is awarded to the candidate/s."
05	Throwing of Question paper after writing the answers on it to the other candidate(s) with the intention to help the other candidate(s). OR Throwing / Sending the Question paper/ questions contained in the question paper on any sheet/article out during the period of examination with an intention to receive assistance and caught by the Invigilator or by an Officer involved in the conduct of examinations	The candidate is to be sent out of the examination hall immediately after obtaining his/her written explanation and duly confiscating his/her Hall-ticket. He/she shall be allowed to appear for the remaining subjects in that examination by obtaining duplicate hall ticket. The performance of the candidates in that subject shall be cancelled. Further depending on severity of offence or reoccurrence of the offence by the student, the Malpractices prosecuting committee may impose the cancellation of performance of the candidate in two or more or ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) in that semester examination.
06	Exchanging intentionally the answer scripts with a view to give or take help from another examinee.	The candidates (both who helps and who takes help) are to be sent out of the examination hall immediately after obtaining his/her written explanation and duly confiscating his/her Hall-ticket. The performance of all the candidates involved in the act in all subjects in that particular year/semester examination (whole/ part examination, as the case may be, including Practicals) shall be cancelled.

07	Taking away the answer book or leaving the examination hall without handing over the answer book to the Invigilating Staff whether returned Subsequently or tearing the answer Book.	The performance of the candidate in all subjects in that semester examination (whole/part examination, as the case may be, including Practicals) shall be cancelled and shall not be permitted to appear for whole/part examination, as the case may be, for next subsequent semester examinations.
08	Writing of answers in the answer book by his/her associates in the examination hall or at any other level.	The performance of all the candidates involved in the act in all subjects in that particular year/semester examination (whole/part examination, as the case may be, including Practicals) shall be cancelled and the candidates shall not be permitted to appear for TWO subsequent semesters examinations and they shall not be permitted to study the next higher class (debarred for one semester).
09	Obstructing the Chief Superintendent from performing his/her duties, abusing, threatening and showing disrespect towards Invigilator/ Chief Superintendent/ any other official connected with the conduct of examination within the institution premises.	The culprits are to be handed over to the Police immediately and a Criminal case is to be booked against them. The performance of the candidate in the particular year/ semester examination in ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) shall be cancelled and the candidates shall not be permitted to appear for TWO subsequent semesters examinations and they shall not be permitted to study the next higher class (debarred for one semester).
10	Substitution of answer book. OR Insertion of drawing sheets or replacement of main answer book written outside with one written inside the examination hall.	The performance of the candidate in all subjects in that semester examination (whole/ part examination, as the case may be, including Practicals) shall be cancelled and the candidate shall not be permitted to appear for TWO subsequent examinations and he/she is not permitted to study next higher class (debarred for one semester).
11	Impersonation.	The performance of both the candidates, i.e., the impostor and the candidate, who is being impersonated, in all subjects in that semester examination (whole/ part examination, as the case may be, including Practicals) shall be cancelled and they are not permitted to study and appear for any examination for the next THREE semesters (including academic year in which the impersonation has taken place) in respect of either or both the candidates. A Criminal case may be lodged in the Police Station if the impostor is an outsider
12	Physical assault within the institution premises on personnel connected with the conduct of examinations.	The performance of the candidate in all the subjects in that semester examination (whole/part examination, as the case may be, including Practicals) shall be cancelled and the

		candidate shall not be permitted to appear for THREE subsequent examinations and he/she is not permitted to study next higher class (debarred for two semester), if any, till he/she completes the punishment period. A Criminal / Disciplinary case is to be booked against the culprits involved in the act.
13	Possession of blank main answer book/ additional answer book/ drawing sheet/ graph sheet which have not been issued in the Examination hall on the day of exam.	A Criminal / Disciplinary case is to be booked against the candidate. The matter should be brought to the notice of the authorities for initiation of appropriate action against all the guilty. The performance of the candidate in all subjects in that semester examination (whole/part examination, as the case may be, including Practicals) shall be cancelled.
14	Other offences, if any, not covered under the above provisions.	The Malpractice Prosecuting Committee shall make specific recommendations on the punishment to be awarded keeping in view the gravity of offence and also the scale of punishment, as above.

N O T E :

1. No re-examination shall be conducted, where candidates resort to boycott of examinations on any pretext.

2. In case a candidate resorting to malpractice by copying from any material in his/her possession and/or by any means is caught by the Flying Squad or Observers or any other Officer posted for duty for the examination, the explanation of the Invigilator in that particular hall of examination shall be called for, for not detecting the same and appropriate disciplinary action be initiated against him/her, after examining his/her explanation in the matter.

3. In all the malpractice cases the report made by the Invigilators should be thoroughly enquired into by the Chief Superintendent concerned and he/she should satisfy himself/herself with all the details in the Invigilators report and record the same in his/her report.

4. In cases where there is a laxity on the part of invigilators and chief superintendents and other officials connected with the conduct of examinations in the discharge of their duties properly, such as in cases where mass copying is reported in an examination hall or where the candidate involved in malpractice in an examination hall is booked by flying squad or others but not the invigilator, then appropriate disciplinary action should be taken against all the staff members involved, after giving them notice and considering their explanations, if any, offered.

5. Punishment for different offences committed in all cases and its duration is mentioned above. It is quite possible that in few cases, the punishment recommended to the candidates, may exceed, the validity of the Curriculum in existence. In such cases, the punishment period should be limited to that extent within which the candidate has to obtain his/her B.Tech. In certain cases, the candidate may not get any more chances to appear for examination and qualify for the award of B.Tech. The candidate will have to suffer the consequence for his/her misdemeanor.

6. In all cases of Malpractice, the hall ticket of the candidate is to be confiscated and shall be sent to the Malpractices prosecuting committee along with the answer script in separate cover. The candidate shall not be permitted to appear for the remaining subjects if any, in that examination.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

PROFORMA – I

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

MAL-PRACTICE CASE REPORT

1. Examination Hall : _____

2. Date of Examination : _____

3. Time of Examination : _____

4.a) Course : _____

   b) Year/Semester : _____

   c) Scheme : _____

5. Subject in which candidate is booked:
   a) Subject Code : _____

   b) Subject : _____

6. Particulars of the candidate booked:
   a) Regd. No. : _____

   b) Name : _____

   c) Residential address : _____

   : _____

   : _____

7. (a) Case booked by : Invigilator / Squad Members / Surprise Check Squad / Other Invigilator / Chief superintendent / Examination officers (Strike out whichever is not applicable)

   (b) Name & Designation of the : _____
   Staff who booked the case
   (c) Name & Designation of the : _____

   Other invigilators in the Hall : _____

   as witness. : _____

8. Give Full Details of the Offence : _____

   _____

   _____

   _____

   _____

   _____

9. Give full details of Supporting material like Written Chits, Printed material, Mobile Phones, Books, Matter written on Scale, Calculator case etc., (matter should be related to the subject of examination on that day). If copied, the copied matter is to be marked in the supporting material and write Regd. No. of the candidate on the supporting material and should be sent to this office along with the answer booklet.

11. Signature of the Invigilator   : _____
    (whether the case is booked by him or by other officials)

12. Whether the student has given :   YES / NO
    the statement or not ?

13. Signature of the candidate   : _____

14. Remarks of the   : _____

    Chief Superintendent   _____

          _____

          _____

SIGNATURE OF THE CHIEF SUPERINTENDENT

Encl: 1) Answer-script
     2) Forbidden confiscated material
     3) Statement of Student.

17.0   AMENDMENTS TO REGULATIONS:

The Academic Council of Bapatla Engineering College (Autonomous) reserves the right to revise, amend, change or nullify the Regulations, Schemes of Examinations, and/ or Syllabi or any other matter pertained that meets to the needs of the students, society and industry without any notice and the decision is final.

DISCIPLINE AND CODE OF CONDUCT FOR STUDENTS

The following are some of the important rules of discipline. All students are required to be aware of and act consistently with these values.

1. Students must punctually attend all lectures, practicals, tutorials, assignments, tests, examinations, etc. A student whose attendance and/or progress in the various tests and examinations are not satisfactory and who does not perform the required number of assignments, tutorials and/or practicals are likely to lose their terms. Prolonged absence even on ground of ill health may also lead to loss of terms. Defaulters will not be sent up for Final /University Examinations.

2. The identity card is meant for identifying bonafide students and is used for permitting the students to participate in various activities and programs of the college. Every student must wear Identity card as long as he/she is in the college campus. It must be produced by the student whenever demanded by the member of the teaching or non-teaching staff of the college. Every student must wear his/her Identity card in the college every day. He/She must take proper care of it to avoid its misuse by other students and outsiders. In case the Identity card is lost, the matter should be immediately reported to the Principal and an application should be made for a duplicate Identity card, which will be issued on payment of charges.

3. The conduct of the students in the classes and in the premises of the college shall be such as will cause no disturbance to teachers, fellow students or other classes.

4. Every student shall wear a clean formal dress while coming to the college also when representing the college for various activities out station.

5. No Society or Association shall be formed in the College and no person should be invited in the college campus without the specific permission of the Principal.

6. No student is allowed to display any Notice/Circular/Poster/Banner in the College premises without the prior permission of the Principal.

7. Using foul language in the college campus is prohibited. If any student is caught using foul language, disciplinary action shall be initiated against the student.

8. Use of **BEC name tag or logo** by the students for their caste, political, religious, personal reasons is prohibited. Further placing banners on caste, political, religious, personal reasons, promoting cinema heroes & political leaders, taking possessions and burning fire crackers in front of the college is strictly prohibited. If any student is involved in such activities in and around the campus, severe disciplinary action will be taken including rusticating from the college and filing a criminal case.

9. Outsiders are not permitted in the college premises without the prior permission of the Principal. College students are not allowed to bring their relatives/friends to the college premises without the permission of the principal.

10. All meetings, cultural programs, debates, elocutions etc. organized on the college premises must be held in presence of teaching staff members and with the prior permission of the Principal. The subjects of debates/elocutions must have the prior approval of the principal.

11. Conducting fresher's meet, farewell meets etc. by the students outside the campus are prohibited. If any student is involved in such activities (organizing as well as participating), severe disciplinary action will be taken including rusticating from the college.

12. Students must take proper care of the college property. Strict action will be taken against students damaging College property and will be required to compensate the damage.

13. Students should not be involved in academic offences including cheating or plagiarism in academic course work malpractices at the College/Board/University Examinations

14. Smoking is strictly prohibited in the college premises.

15. If, for any reason, the continuance of a student in the College is found detrimental to the best interest of the college, the Management may ask the student to leave the college without assigning any reasons and the decision will be final and binding on the student.

16. Playing music on Transistors, Tape-Recorders, Car Stereos, Mobile phones or any other similar gadgets with or without earphones is strictly prohibited in the college premises. Defaulters will be punished and their instrument shall be confiscated.

17. Use of Mobile phones is strictly prohibited in the academic area of the college, Defaulters will be penalized and their instrument confiscated.

18. Students who are travelling to college on personal vehicles (2/4 wheelers) need to have valid driving license issued by RTO and follow all the rules listed by RTO. Students have to park the vehicle in the parking area of the college.

19. Students must not hang around in the college premises while the classes are at work.

20. Students must not attend classes other than their own without the permission of the authority concerned.

21. Students shall do nothing inside or outside the college that will interface with the discipline of the college or tarnish the image of the college.

22. Students are not allowed to communicate any information about college matters to Press.

23. Matters not covered above will be decided at the discretion of the Principal.

Acts of misbehavior, misconduct, indiscipline or violation of the Rules of Discipline mentioned above liable for one more punishments as stated below:
   A. Warning to the students.
   B. Warning to the student as well as inform the parents.
   C. Imposition of a fine.

D. Denial of gymkhana, library, laboratory, N.C.C., N.S.S. student aid or any other facility for a specified period or for the whole Term/Year.
E. Expulsion from College for a specified period
F. Cancellation of Terms.
G. Refusal of admission in the term or academic year.
H. Cancellation of admission.
I. Rustication.

Anti Ragging Rules and Regulations
(As per AICTE Norms)

1. **What constitutes Ragging: -** Ragging constitutes one or more of any of the following acts:

a. any conduct by any student or students whether by words spoken or written or by an act which has the effect of teasing, treating or handling with rudeness a fresher or any other student;

b. indulging in rowdy or undisciplined activities by any student or students which causes or is likely to cause annoyance, hardship, physical or psychological harm or to raise fear or apprehension thereof in any fresher or any other student;

c. asking any student to do any act which such student will not in the ordinary course do and which has the effect of causing or generating a sense of shame, or torment or embarrassment so as to adversely affect the physique or psyche of such fresher or any other student;

d. any act by a senior student that prevents, disrupts or disturbs the regular academic activity of any other student or a fresher;

e. exploiting the services of a fresher or any other student for completing the academic tasks assigned to an individual or a group of students.

f. any act of financial extortion or forceful expenditure burden put on a fresher or any other student by students;

g. any act of physical abuse including all variants of it: sexual abuse, homosexual assaults, stripping, forcing obscene and lewd acts, gestures, causing bodily harm or any other danger to health or person;

h. any act or abuse by spoken words, emails, posts, public insults which would also include deriving perverted pleasure, vicarious or sadistic thrill from actively or passively participating in the discomfiture to fresher or any other student;

i. any act that affects the mental health and self-confidence of a fresher or any other student with or without an intent to derive a sadistic pleasure or showing off power, authority or superiority by a student over any fresher or any other student.

2. Actions to be taken against students for indulging and abetting ragging in technical institutions Universities including Deemed to be University imparting technical education:-

1. The punishment to be meted out to the persons indulged in ragging has to be exemplary and justifiably harsh to act as a deterrent against recurrence of such incidents.

2. Every single incident of ragging a First Information Report (FIR) must be filed without exception by the institutional authorities with the local police authorities.

3. The Anti-Ragging Committee of the institution shall take an appropriate decision, with regard to punishment or otherwise, depending on the facts of each incident of ragging and nature and gravity of the incident of ragging.

4. a) Depending upon the nature and gravity of the offence as established the possible punishments for those found guilty of ragging at the institution level shall be any one or any combination of the following:-

   (i)   Cancellation of admission
   (ii)   Suspension from attending classes
   (iii)   Withholding/withdrawing scholarship/fellowship and other benefits
   (iv)   Debarring from appearing in any test/examination or other evaluation process
   (v)   Withholding results
   (vi)   Debarring from representing the institution in any regional, national or international meet, tournament, youth festival, etc.
   (vii)   Suspension/expulsion from the hostel
   (viii) Rustication from the institution for period ranging from 1 to 4 semesters
   (ix)   Expulsion from the institution and consequent debarring from admission to any other institution.
   (x)   Collective punishment: when the persons committing or abetting the crime of ragging are not identified, the institution shall resort to collective punishment as a deterrent to ensure community pressure on the potential raggers.

Important Contact Numbers (In case of Ragging)

Sl.No.	Member Category	Name of the Member	Phone No
1.	Principal	Dr. V. Damodara Naidu, M.Tech., Ph.D.	8332857027
2.	**HODs:** Chemical Engg. Civil Engg. CSE ECE EEE EIE IT Mechanical Engg. M.C.A. Mathematics Physics Chemistry English T& P Warden, Campus Hostel Coordinator for anti ragging	Dr. J.S.Rao, M.Tech., Ph.D. Dr. Ch.Naga Satish Kumar, M.Tech., Ph.D. Dr. Shaik Nazeer, M.Tech., Ph.D., Dr. B. Chandramohan, M.Tech., Ph.D. Dr. N.Rama Devi, M.Tech.,Ph.D., Prof. Ch.Ramesh M.Tech., (Ph.D.) Prof. N.Sivarama Prasad, M.Tech.,(Ph.D.) Dr. T.Nanacharaiah, M.Tech., Ph.D. Sri. K.N.Prasad, M.C.A.,M.Tech., Dr. P.VijayaSaradhi, M.Sc.,M.Phil.,Ph.D. Dr. K.Rama Krishna, M.Sc., Ph.D. Dr. V.Madhava Rao, M.Sc., Ph.D. Dr. P.Asha Madhavi, M.A.,M.Phil.,Ph.D. Mr. Justin Chako Dr. T.Chandrasekhara Rao Mr. Y. Narendra	9490224100 9440110124 9642302577 9491112477 9703374075 9701407595 9885882200 9492715018 8121708069 9949559288 9441207751 8374498399 9951507742 9845787354 9848276672 9704090941
4.	Police Department	Crime Stopper SP, Guntur Rural SP Camp Office DSP, Bapatla CI, Bapatla Town CI, Bapatla Rural PS, Bapatla Town SI, Bapatla Rural **Anti-Ragging Toll Free**	1090 9440796200 08632234828 9440796165 9440796171 9440796221 08643-224036 9440796258 **18004255314**

BAPATLA ENGINEERING COLLEGE (AUTONOMOUS)
ACADEMIC CALANDER
ACADEMIC CALANDER FOR I & II B.TECH CLASSES
FOR THE ACADEMIC YEAR - 2019-20

I B.TECH. CLASSES

DESCRIPTION	I SEMESTER	II SEMESTER
COMMENCEMENT OF SEMESTER	**05-08-2019**	**02-01-2020**
ORIENTATION PROGRAM	05-08-2019 TO 17-08-2019	---
COMMENCEMENT OF CLASS WORK	19-08-2019	02-01-2020
FIRST MID-TERM EXMINATIONS	15-10-2019 TO 19-10-2019	26-02-2020 TO 02-03-2020
LAST INSTRUCTION DAY	07-12-2019	20-04-2020
SECOND MID-TERM EXAMINATIONS	09-12-2019 TO 13-12-2019	22-04-2020 TO 26-04-2020
PREPARATION HOLIDAYS	14-12-2019 TO 18-12-2019	27-04-2020 TO 01-05-2020
PROPOSED DATE OF SEMESTER END EXAMINATIONS	19-12-2019 TO 31-12-2019	02-05-2020 TO 15-05-2020

II B.TECH. CLASSES: -

DESCRIPTION	I SEMESTER	II SEMESTER
COMMENCEMENT OF CLASS WORK	**24.06.2019**	**02.12.2019**
FIRST TERM EXMINATIONS	04.09.2019 - 11.09.2019	03.02.2020 - 08.02.2020
LAST INSTRUCTION DAY	02.11.2019	28.03.2020
SECOND TERM EXAMINATIONS	04.11.2019 - 09.11.2019	30.03.2020 - 04.04.2020
PREPARATION HOLIDAYS	10.11.2019 - 13.11.2019	05.04.2020 - 08.04.2020
SEMESTER END EXAMINATIONS	**14.11.2019 - 30.11.2019**	**09.04.2020 - 25.04.2020**

Dasara Vacation   : 06.10.2019 to 13.10.2019
Pongal Vacation   : 12.01.2020 to 19.01.2020

Commencement of class work for the academic year 2020-21 for II & III B.Tech: 15.06.2020

P R I N C I P A L

Library resources, facilities & services

The Central Library of Bapatla Engineering College, one of the biggest Libraries in the state with 22,000 Sq feet has been playing a vital role as information centre catering to the academic and learning needs of the students & faculty. The Library received Best Library Award Four times from Acharya Nagarjuna University.

Library Timings: The Central Library functions from 7AM to 7 PM on all working days.

Resources: As a knowledge bank, the Central Library of BEC has a rich collection of 75,317 books, 523 online International technical journals (Science Direct-275 ,IEEE-ASPP-183 ,ASME- 30 ,ASCE-35) and 120 print journals.

Library Automation: The Library catalogue of books (OPAC) & Circulation of Books (Issue & Return of Books) have been fully computerized with SOUL Library Software & Bar coding system for well maintenance and effective functioning of the Library.

Circulation of Books: All the students are allowed to borrow 2 books per head from the Library on their borrower tickets for a period of one week. Students are required to pay fine for the late return of books as per the Library rules.

Reference book service: A separate reference section is maintained in the Central Library with a stack of 14,970 books including encyclopedias, subject hand books & reference text books.

Issue of reference text books: Students may borrow the reference text books half an hour before closing the Library and return the same by 7.30 AM in the next day.

Book Bank facility: A Book Bank is maintained in the Central Library with 20,634 text books for the benefit of SC, ST & BC category students. All SC & ST category students (scholarship holders) are eligible to borrow 12 books per head from Book Bank for each semester. BC category students are allowed to borrow 2 books per head from Book Bank for each semester.

No Dues Certificate: The student who completed the course of study in the College should get a no dues certificate from the Library by returning all the tickets& books borrowed from the College Library & Book Bank.

Library staff: The Central Library has 08 well experienced staff including the Librarian having more than 10 to 25 years of working experience.

Digital Library: A separate Digital Library is maintained in the Central Library with the infrastructure of 28 computers and 3,237 educational CDs. The Digital Library provides internet facility to the students and faculty.

Students can access the full text of the following e resources in the Digital Library.

- International e journals (Science Direct, IEEE, ASME & ASCE)
- NPTEL Video courses developed by all IITs. (Total 236 Courses - 9,173 Lessons)
- e – books and e – journals of DELNET Digital Library

Xeroxing facility: The Library is providing reprographic facility to students to disseminate material quickly and cost effectively at 50ps. per copy.

SEMESTER - I

(Commencement of class work: 19-8-2019)

DAY/TIME	7.30 to 8.15	8.15 to 9.00	9.00 to 9.45	9.45 to 10.30	10.30 to 11.00	11.00 to 11.45	11.45 to 12.30	12.30 to 1.15
MON								
TUE								
WED					Break			
THU								
FRI								
SAT								

Subjects & Staff

SUJECT CODE	FACULTY NAME	PHONE NO	SUJECT CODE	FACULTY NAME	PHONE NO
S1			S6		
S2			L1		
S3			L2		
S4			L3		
S5					

Bapatla Engineering College (Autonomous) :: BAPATLA

DEPARTMENT OF …………………………..

Academic Year 2019-2020

Schedule for Class Work (*w.e.f. 02-01-2020*)

SEMESTER - II

(Commencement of class work: 02-01-2020)

DAY/TIME	7.30 to 8.15	8.15 to 9.00	9.00 to 9.45	9.45 to 10.30	10.30 to 11.00	11.00 to 11.45	11.45 to 12.30	12.30 to 1.15
MON								
TUE								
WED					Break			
THU								
FRI								
SAT								

Subjects & Staff

SUJECT CODE	FACULTY NAME	PHONE NO	SUJECT CODE	FACULTY NAME	PHONE NO
S1			S6		
S2			L1		
S3			L2		
S4			L3		
S5					

Bapatla Engineering College (Autonomous) :: BAPATLA
DEPARTMENT OF …………………………..
Academic Year 2019-2020
Schedule for Class Work (*w.e.f. 24-06-2019*)

SEMESTER - III

(Commencement of class work: 24-6-2019)

DAY/TIME	7.30 to 8.15	8.15 to 9.00	9.00 to 9.45	9.45 to 10.30	10.30 to 11.00	11.00 to 11.45	11.45 to 12.30	12.30 to 1.15
MON								
TUE								
WED					Break			
THU								
FRI								
SAT								

Subjects & Staff

SUJECT CODE	FACULTY NAME	PHONE NO	SUJECT CODE	FACULTY NAME	PHONE NO
S1			S6		
S2			L1		
S3			L2		
S4			L3		
S5					

Bapatla Engineering College (Autonomous) :: BAPATLA

DEPARTMENT OF …………………………..

Academic Year 2019-2020

Schedule for Class Work (*w.e.f. 02-12-2019*)

SEMESTER - IV

(Commencement of class work: 02-12-2019)

DAY/TIME	7.30 to 8.15	8.15 to 9.00	9.00 to 9.45	9.45 to 10.30	10.30 to 11.00	11.00 to 11.45	11.45 to 12.30	12.30 to 1.15
MON								
TUE								
WED					Break			
THU								
FRI								
SAT								

Subjects & Staff

SUJECT CODE	FACULTY NAME	PHONE NO	SUJECT CODE	FACULTY NAME	PHONE NO
S1			S6		
S2			L1		
S3			L2		
S4			L3		
S5					

Notes

Notes

Notes

Bapatla Engineering College

(*Autonomous*)

BAPATLA

B.Tech

Mechanical Engineering

Curriculum

With Effect from 2018-19 (R18 Regulations)

Bapatla Engineering College:: Bapatla

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Mechanical Engineering
Effective From the Academic Year2018-2019(R18 Regulations)
First Year B.Tech(SEMESTER – I)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA001	Linear Algebra and Ordinary Differential Equations	4	0	0	4	50	50	100	3
18PH002	Advanced Optics and Material Testing	4	1	0	5	50	50	100	4
18ME103	Engineering Mechanics- I	4	1	0	5	50	50	100	4
18EE001	Basic Electrical/ ElectronicsEngg	4	0	0	4	50	50	100	3
18CS001	Programming for Problem Solving	4	0	0	4	50	50	100	3
18PHL001	Physics Lab	0	0	3	3	50	50	100	1
18EEL01	Basic Electrical/ ElectronicsEngg. Lab	0	0	3	3	50	50	100	1
18CSL01	Programming for Problem Solving lab	0	0	3	3	50	50	100	1
	NCC/NSS			3	3				0
	TOTAL	20	2	12	34	400	400	800	20

CIE: Continuous Internal Evaluation   SEE: Semester End Examination
L: Lecture,   T: Tutorial,   P: Practical

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Mechanical Engineering
Effective From the Academic Year2018-2019(R18 Regulations)
First Year B.Tech(SEMESTER – II)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA002	Numerical Methods and Advanced Calculus	4	0	0	4	50	50	100	3
18CY001	Chemistry	4	0	0	4	50	50	100	3
18ME203	Engineering Mechanics- II	4	1	0	5	50	50	100	4
18CE001	Environmental Studies	3	0	0	3	50	50	100	2
18EL001	Communicative English	3	0	0	3	50	50	100	2
18MEL01	Engineering Graphics	1	0	4	5	50	50	100	3
18CYL01	Chemistry Lab	0	0	3	3	50	50	100	1
18ELL01	English Communication Skills Lab	0	0	3	3	50	50	100	1
18MEL02	Workshop practice	0	0	3	3	50	50	100	1
	NCC/NSS	0	0	3	3				0
	TOTAL	19	1	16	36	450	450	900	20

CIE: Continuous Internal Evaluation   SEE: Semester End Examination
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BAPATLA ENGINEERING COLLEGE:: BAPATLA
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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Mechanical Engineering
Effective from the Academic Year2018-2019(R18 Regulations)
Second Year B.Tech(SEMESTER – III)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18ME301	Strength of Materials-I	4	1	0	5	50	50	100	4
18ME302	Professional Ethics& Human Values	4	0	0	4	50	50	100	3
18ME303	Thermodynamics	4	1	0	5	50	50	100	4
18ME304	Fluid Mechanics &Hydraulic Machines	4	1	0	5	50	50	100	4
18ME305	Basic manufacturing processes	4	0	0	4	50	50	100	3
18ME306	Constitution of India	2	0	0	2	50	50	100	0
18MEL31	Strength of Materials and Fluid Mechanics lab	0	0	3	3	50	50	100	1
18MEL32	Basic Manufacturing Processes lab	0	0	3	3	50	50	100	1
18MEL33	Computer aided drafting and Modelling lab	0	0	3	3	50	50	100	1
	NCC/NSS			3	3				0
	TOTAL	22	3	12	37	450	450	900	21

CIE: Continuous Internal Evaluation   SEE: Semester End Examination
L: Lecture,   T: Tutorial,   P: Practical

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Mechanical Engineering
Effective from the Academic Year2018-2019(R18 Regulations)
Second Year B.Tech(SEMESTER – IV)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA003	Probability and Statistics	4	0	0	4	50	50	100	3
18ME401	Strength of Materials- II	4	1	0	5	50	50	100	4
18ME402	Applied Thermodynamics	4	1	0	5	50	50	100	4
18ME403	Materials Engineering	4	0	0	4	50	50	100	3
18ME404	Kinematics of Machines	4	1	0	5	50	50	100	4
18EL002	Technical English	3	0	0	3	50	50	100	2
18ME405	Essence of Indian Traditional Knowledge	2	0	0	2	50	50	100	0
18MAL01	Probability and Statistics lab	0	0	3	3	50	50	100	1
18MEL41	Pneumatic & Hydraulic drives lab	0	0	3	3	50	50	100	1
	NCC/NSS			3	3				0
	TOTAL	25	3	9	37	450	450	900	22

CIE: Continuous Internal Evaluation   SEE: Semester End Examination
L: Lecture,   T: Tutorial,   P: Practical

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Mechanical Engineering
Effective Fromthe Academic Year2018-2019(R18 Regulations)
Third Year B.Tech(SEMESTER – V)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18ME501	Machine Dynamics	4	1	0	5	50	50	100	4
18ME502	IC Engines & Gas Turbines	4	0	0	4	50	50	100	3
18ME503	Design of Machine Elements-I	4	1	0	5	50	50	100	4
18ME504	Metal Cutting & Machine Tools	4	0	0	4	50	50	100	3
18ME505	Industrial Engineering &Management	4	0	0	4	50	50	100	3
18MED11/12/13	Elective-I	4	0	0	4	50	50	100	3
18MEL51	CAE lab	0	0	3	3	50	50	100	1
18MEL52	Fuels & IC Engines lab	0	0	3	3	50	50	100	1
	NCC/NSS			3	3				0
	TOTAL	24	2	9	35	400	400	800	22

CIE: Continuous Internal Evaluation   SEE: Semester End Examination
L: Lecture,   T: Tutorial,   P: Practical

Elective-I:

1. Operations Research
2. Computational Fluid Dynamics
3. Composite Materials

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Mechanical Engineering

Effective Fromthe Academic Year2018-2019(R18 Regulations)

Third Year B.Tech(SEMESTER – VI)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18ME601	Engineering Economics & Accountancy	3	0	0	3	50	50	100	2
18ME602	Heat transfer	4	1	0	5	50	50	100	4
18ME603	Design of Machine Elements – II	4	1	0	5	50	50	100	4
18ME604	Manufacturing Technology	4	0	0	4	50	50	100	3
18MED21/22/23	Elective –II	4	0	0	4	50	50	100	3
18MEL61	Heat Transfer Lab	0	0	3	3	50	50	100	1
18MEL62	Machine shop practice	0	0	3	3	50	50	100	1
18ELL02	Soft Skills Lab	0	0	3	3	50	50	100	1
	MOOCs			3	3				2
	TOTAL	19	2	12	33	400	400	800	21

CIE: Continuous Internal Evaluation   SEE: Semester End Examination

L: Lecture,   T: Tutorial,   P: Practical

Elective –II

1. Finite Element Analysis
2. Power Plant Engineering
3. Mechatronics

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Mechanical Engineering
Effective Fromthe Academic Year2018-2019(R18 Regulations)
Fourth Year B.Tech(SEMESTER – VII)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18ME701	Automation in Manufacturing	4	0	0	4	50	50	100	3
18ME702	Operations Management	4	0	0	4	50	50	100	3
18ME703	Instrumentation and Control Systems	4	0	0	4	50	50	100	3
18—I--	Institutional Elective -I	4	0	0	4	50	50	100	3
18MED31/32/33/34	Elective –III	4	0	0	4	50	50	100	3
18MED41/42/43	Elective-IV	4	0	0	4	50	50	100	3
18MEP01	Project-I	0	0	4	4	50	50	100	2
18MEL71	Design & Metrology lab	0	0	3	3	50	50	100	1
18MEL72	Sensorics& PLC lab	0	0	3	3	50	50	100	1
18MEII1	Internship								2
	TOTAL	24	0	10	34	450	450	900	24

CIE: Continuous Internal Evaluation   SEE: Semester End Examination
L: Lecture,   T: Tutorial,   P: Practical

Elective –III
1. Fluid Power Systems
2. Computer Aided Design
3. Refrigeration and Air conditioning
4. Project Management

Elective – IV
1. Mechanical Vibrations
2. Robotics
3. Supply Chain Management

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(Autonomous)
SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Mechanical Engineering
Effective Fromthe Academic Year2018-2019(R18 Regulations)
Fourth Year B.Tech(SEMESTER – VIII)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MED51/52/53/54	Elective –V	4	0	0	4	50	50	100	3
18—I--	Institutional Elective –II	4	0	0	4	50	50	100	3
18MEP02	Project-II	0	0	12	12	75	75	150	10
18MEL81	CAM lab	0	0	3	3	50	50	100	1
	TOTAL	8	0	15	23	225	225	450	17

CIE: Continuous Internal Evaluation   SEE: Semester End Examination
L: Lecture,   T: Tutorial,   P: Practical

Elective –V

1. Advanced Manufacturing
2. Total Quality Management
3. Automobile Engineering
4. Entrepreneurship Development

Institutional Elective-I (in VII semester – position as 4th theory subject)

18CEI01: Air Pollution & Control
18CEI02: Sustainable Water and Sanitation
18CSI01: Java Programming
18CSI02: Database Management Systems
18ECI01: Consumer Electronics
18ECI02: Embedded Systems
18EEI01: Application of Wavelets to Engineering Problems
18EEI02: Industrial Electrical Systems
18EII01: Introduction to MEMS
18EII02: Power System Instrumentation
18ITI01: Data Analytics
18ITI02: Cyber Security
18MAI01: Linear Algebra
18PHI01: Nano-Materials and Technology
18PHI02: Fibre Optic Communication
18HUI01: System Thinking

Institutional Elective-II(in VIII semester – position as 2nd theory subject)

18CEI03: Disaster Management
18CEI04: Remote sensing & GIS
18CSI03: Python Programming
18CSI04: Computer Networks
18ECI03: Artificial Neural Network
18ECI04: Internet of Things (IoT)
18EEI03: High Voltage Engineering
18EEI04: Energy Auditing and Conservation
18EII03: Robotics and Automation
18EII04: Advanced Computer Control Systems
18ITI03: Mobile Application Developments
18ITI04: Web Technology
18MAI02: Graph Theory
18PHI03: Advanced Materials
18PHI04: Optical Electronics
18HUI02: Organizational Psychology
18HUI03: Telugu Modern Literature

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LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS
18MA001
I Year B. Tech.First Semester

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. To learn about solving a system of linear homogeneous and non-homogeneous equations, finding the inverse of a given square matrix and also its Eigen values and Eigen vectors
2. Identify the type of a given differential equation and select and apply the appropriate analytical technique for finding the solution of first order and higher order ordinary differential equations.
3. Create and analyse mathematical models using first and second order differential equations to solve application problems that arises in engineering.
4. To learn about solving linear Differential equations with constant coefficients with the given initial conditions using Laplace transform technique.

Course Outcomes: Students will be able to
1. Apply elementary row operations to find the rank of a matrix, to solve a system of linear equations and to find the inverse of a matrix.
2. Find the Eigen values and Eigen vectors of the given square matrix and also compute the higher powers of the given matrix.
3. Solve separable, linear, exact differential equations with and without initial conditions.
4. Distinguish between linear and non-linear differential equation.
5. Write the piecewise continuous functions in terms of unit step functions and hence find its Laplace transforms.
6. Solve linear differential equation with constant coefficients and unit step input functions using Laplace transforms technique.

UNIT-I

Linear Algebra: Rank of a Matrix; Elementary transformations of a matrix; Gauss-Jordan method of finding the inverse; Consistency of linear System of equations: Rouches theorem, System of linear Non-homogeneous equations, System of linear homogeneous equations; vectors; Eigen values; properties of Eigen values(without proofs); Cayley-Hamilton theorem (without proof).

[Sections: 2.7.1; 2.7.2; 2.7.6; 2.10.1; 2.10.2; 2.10.3; 2.12.1; 2.13.1; 2.14; 2.15.]

[12 Hours]

UNIT-II

Differential Equations of first order: Definitions; Formation of a Differential equation; Solution of a Differential equation; Equations of the first order and first degree; variables

separable; Linear Equations; Bernoulli's equation; Exact Differential equations; Equations reducible to Exact equations: I.F found by inspection, I.F of a Homogeneous equation, In the equation M dx+ N dy=0.

Applications of a first order Differential equations: Newton's law of cooling; Rate of decay of Radio-active materials.

[Sections: 11.1; 11.3; 11.4; 11.5; 11.6; 11.9; 11.10; 11.11; 11.12.1; 11.12.2; 11.12.4; 12.6;

12.8]   [12 Hours]

UNIT-III

Linear Differential Equations: Definitions; Theorem; Operator D; Rules for finding the complementary function; Inverse operator; Rules for finding the Particular Integral; Working procedure to solve the equation; Method of Variation of Parameters; Applications of Linear Differential Equations: Oscillatory Electrical Circuits.

[Sections: 13.1; 13.2.1; 13.3; 13.4; 13.5; 13.6; 13.7;13.8.1;14.1;14.5]   [12 Hours]

UNIT-IV

Laplace Transforms: Definition; conditions for the existence; Transforms of elementary functions; properties of Laplace Transforms; Transforms of derivatives; Transforms of integrals; Multiplication by t^n; Division by t; Inverse transforms- Method of partial fractions; Other methods of finding inverse transforms; Convolution theorem(without proof); Application to differential equations: Solution of ODE with constant coefficients using Laplace transforms.

[Sections:21.2.1; 21.2.2; 21.3; 21.4; 21.7; 21.8; 21.9; 21.10; 21.12; 21.13; 21.14; 21.15.1]

[12 Hours]

TEXT BOOKS
1. B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS
1. ErwinKreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.
2. N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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PHYSICS
18PH001
I Year B. Tech.First Semester

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)		:	50

Course Objectives:
1. To circulate the knowledge about the advanced optics and know its Engineering applications.
2. Tofamiliarize the basis of quantum theory and to make students to solve the physical problems.
3. To classify solids and to have a basic idea about the structural determination of crystals.
4. To make aware of some of the analytical techniques for material testing.

Course Outcomes:
1. Student's ability to understand the principles in the production and application of lasers and their effective utilization in optical communications.
2. Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.
3. Students demonstrate the ability to apply knowledge of band theory of solids and to make understand the concept of energy band gap and hole.
4. Ability to understand the crystal geometrics and estimation of crystal structure by X-ray diffraction technique.
5. Students ability to understand the principle in the production and applications of ultrasonics and extend it for material testing using various nuclear techniques.

UNIT-I

ADVANCED OPTICS

Lasers: Interaction of radiation with matter. Einstein co-efficients, Properties of laser, Population inversion, LASER principle, pumping schemes-Three level and four level laser, Types of lasers: solid-state lasers (Ruby), gas lasers (He-Ne), Semiconductor lasers; applications of lasers in industry and medicine.
Fibre Optics: Importance of optical fibre, Structure and principle of optical fibre, acceptance angle and numerical aperture, Types of optical fibres based on modes and refractive index, V-number, losses associated with optical fibres, fibre optical communication, advantages of optical fibres

UNIT-II

Quantum Mechanics
Dual nature of light, de-Brogli"s concept of matter waves, Davisson-Germer electron diffraction experiment, Heisenberg Uncertainty principle and applications (non-existence of electron in a nucleus and finite width of spectral lines), one dimensional time- independent and dependent Schrödinger wave equations, physical significance of wave function,

applications of time-independent Schrödinger wave equation to particle in a box(one dimensional), tunneling, the scanning tunneling microscope.

UNIT-III

Band theory of solids and Structure determination
Band theory of Solids: Failures of classical free electron theory, success and failures of quantum free electron theory, Bloch theorem statement, Kronig-Penny model (without derivation), effective mass of electron, concepts of energy band gap and hole.
Structure determination: Crystal lattices (Bravias), Crystal systems and structures, planes, Miller indices, Bragg''s law, structural analysis of crystals using X-Ray powder diffraction method (XRD).

UNIT-IV

Ultrasonics and Nuclear Techniques
Ultrasonics: Properties of ultrasonics, General applications of ultrasonics.
Applications of Ultrasonic Testing: Weld inspection, Material analysis, corrosion testing, concrete under water measurements, Ultrasonic testing in the foundry industry.
NDT: Production of Ultrasonic waves, Pulse echo technique, time of flight diffraction technique, A –scan presentation, B- scan presentation, C –scan presentation.
Nuclear Techniques: Nuclear radio isotopes, Applications of radio isotopes (medical and industry) Properties of α,β,γ-rays and radiographic testing (NDT).

TEXT BOOKS
1. A Text Book of Engineering Physics ,M.N.Avadhanulu& P. Kshirsagar, S.Chand& Co., (Edition – 2013).
2. Engineering physics by S.O.Pillai

REFERENCE BOOKS
1. Engineering physics by R .K.Gour and S.L.Gupta. Dhanpatrai publications.
2. Engineering physics by M .R.Sreenivasan. New age international publications
3. Engineering physics by Palaniswamy. Scitechpublications.
4. Basic engineering physics – Dr.P.srinivasaRao, Dr.K.Muralidhar, Himalaya publication
5. Applied physics - Dr.P.srinivasaRao, Dr.K.Muralidhar, Himalaya publication
6. Engineering physics by Dr.D.Thirupathi Naidu, M. Veeranjaneyulu.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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ENGINEERING MECHANICS - I
18MA103
I Year B. Tech.First Semester

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)		:	50

Course Objectives:
1. To introduce the students to basic laws and principles of Engineering Mechanics with emphasis on the analysis and application to practical Engineering problems, where bodies and systems are in static equilibrium.

Course Outcomes: After completion of the course the students will be able to
1. Find the resultant and analyse the equilibrium of a coplanar concurrent, parallel and general force systems.
2. Find the resultant and analyse the equilibrium of a spatial concurrent force system
3. Apply Coulombs laws of dry friction and analyse bodies and systems subjected to coplanar forces
4. Deduce relationships between external forces and equilibrium configuration using the principal of virtual work
5. Find the properties of plane areas and curves i.e., centroids and moment of inertias

UNIT-I

Introduction:
Engineering mechanics - Units and dimensions - Method of problem solution and the accuracy of solutions.
Concurrent forces in a plane:
Principles of statics - Composition and resolution of forces - Equilibrium of concurrent forces in a plane - Method of projections - Method of moments.
Parallel forces in a plane:
Couple - Resultant and Equilibrium of parallel forces in a plane.

UNIT-II

General case of forces in a plane:
Composition of forces in a plane - Equilibrium of forces in a plane - Analysis of trusses: Method of joints and sections.
Force systems in space (using vector notation):
Position vector - Unit vector - Force vector - Resultant and equilibrium of concurrent forces in space - Moment of a force about a point - Moment of a force about anaxis.

UNIT-III
Friction:
Introduction - Laws of dry friction - Problems involving dry friction: Connected bodies on rough horizontal and inclined planes, Ladder friction and Wedge friction.

Virtual Work:

Introduction - Principle of virtual work - Equilibrium of ideal systems.

UNIT-IV

Centroid, Centre of Mass and Centre of Gravity:
Concept of Centroid, Centre of Mass and Centre of Gravity - Centroid of two dimensional bodies - Problems on locating centroids of simple and composite plane figures and curves – Pappus theorems

Moments of Inertia of Plane figures:
Moments of inertia of a plane figure with respect to an axis in its plane and an axis perpendicular to the plane of the figure - Parallel axis theorem - Moments of inertia of simple and composite figures.

TEXT BOOKS
1. Engineering Mechanics (in SI units) by S Timoshenko, D H Young, J V Raoand SukumarPati, McGraw Hill Education, 5th edition,2016.
2. Engineering Mechanics: Statics and Dynamics by A K Tayal, Umesh publications, 14th edition,2015.

REFERENCE BOOKS
1. Vector mechanics for Engineers: Statics and Dynamics by Ferdinand Beer, E Russell Johnston Jr, David Mazurek, Phillip Cornwell, Brian Self and SanjeevSanghi, McGraw Hill Education, 11th edition,2017.
2. Engineering Mechanics: Statics and Dynamics by R C Hibbeler, Pearson, 14thedition, 2017.
3. Engineering Mechanics (Statics) by J L Meriam and L G Kraige, Wiley student edition, 7th edition.

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
18EE001
I Year B. Tech.First Semester

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)		:	50

Course Objectives:
1. To understand basic Laws in circuits, analysis of simple DC circuits, Theorems and its applications, fundamentals of AC circuits & its analysis and concepts of three phase balanced circuits.
2. To learn basic properties of magnetic materials and its applications.
3. To understand working principle, construction, applications and performance of DC machines, AC machines.
4. To learn basic concepts, working principal, characteristics and applications of semiconductor diode and transistor family.
5. To gain knowledge about the static converters and regulators.
6. To learn basic concepts of power transistors and operational amplifiers closer to practicalapplications.

Course Outcomes: After completion of the course the students will be able to
1. Solve problems involving with DC and AC excitation sources in electrical circuits.
2. Compare properties of magnetic materials and its applications.
3. Analyze construction, principle of operation, application and performance of DC machines and AC machines.
4. Explore characteristics and applications of semiconductor diode and transistor family.
5. Make the static converters and regulators.
6. Analyze concepts of power transistors and operational amplifiers closer to practical applications.

UNIT-I

ElectricalCircuits

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation.Superposition, Thevenin and Norton Theorems. Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase AC circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and deltaconnections.

UNIT-II

Electrical Machines

Magnetic materials, BH characteristics, Construction, working of DC machines, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency.Auto-transformer and three-phase transformer connections.Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of

induction motor.Single-phase induction motor.Construction and working of synchronous generators.

UNIT-III
Semiconductor Diodes and applications
Semiconductor materials, semiconductor diode, Resistance levels, Diode equivalent circuits, Zener diode, Light emitting diode, Load line analysis, half wave rectification, Full wave rectification, Bridge rectifier, Use of capacitor filter in rectifier, Zener diode voltage regulator, Clippers,Clampers

Bipolar Junction Transistors
Transistor construction and operation, Common base configuration, Transistor amplifying action, Common emitter configuration, Common collector configuration, Limits of operation. DC load line and bias point, Voltage divider bias of transistor.

UNIT-IV

Field Effect Transistors
Construction and characteristics of JFET and MOSFET

Operational Amplifiers
Introduction, Differential and common mode operation, OP-AMP Basics, Practical OP-AMP circuits: Inverting amplifier, Non inverting amplifier, Unity follower, summing amplifier, Integrator and differentiator.

TEXT BOOKS
1. S.K.Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Publications.
2. RobertL.Boylestad&LouisNashelsky,„ElectronicDevicesandcircuittheory",PHI Pvt.Limited, 11th edition.
3. Basics of Electrical and Electronics Engineering", Nagsarkar T K and Sukhija M S, Oxford press UniversityPress.

REFERENCE BOOKS
1. David A. Bell, „Electronic Devices and Circuits", oxford publisher,5thedition
2. "Basic Electrical, Electronics and Computer Engineering", Muthusubramanian R, Salivahanan S and Muraleedharan K A, Tata McGraw Hill, Second Edition,(2006). edition, 7th edition.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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PROBLEM SOLVING USING PROGRAMMING
18CS001
I Year B. Tech.First Semester

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives: students will be able to
1. Understand basic concepts of C Programming such as: C-tokens, Operators, Input/output, and Arithmeticrules.
2. Develop problem-solving skills to translate „English" described problems into programs written using Clanguage.
3. Use Conditional Branching, Looping, andFunctions.
4. Apply pointers for parameter passing, referencing and differencing and linking data structures.
5. Manipulate variables and types to change the problem state, including numeric, character, array and pointer types, as well as the use of structures and unions,File.

Course Outcomes: After completion of the course the students will be able to
1. Choose the right data representation formats based on the requirements of the problem.
2. Analyse a given problem and develop an algorithm to solve theproblem.
3. Use the comparisons and limitations of the various programming constructs and choose the right one for the task inhand.
4. Write the program on a computer, edit, compile, debug, correct, recompile and runit.
5. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve thetask.

UNIT-I

Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing I/O Operations.Decision Making and Branching.

Programming Exercises:C-expressions for algebraic expressions, evaluation of arithmetic and Boolean expressions. Syntactic and logical errors in a given program, output of a given program, values of variables at the end of execution of a program fragment, Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers.Computationofdiscountamountondifferenttypesofproductswithdifferent discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, finding given year is leap year or not, and conversion of lower case character to its upper case.

UNIT-II

Decision Making and Looping, Arrays, Character Arrays and Strings.

Programming Exercises for Unit II: To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number.To print graphic patterns of

symbols and numbers.To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is palindrome or not with and without using String Handling Functions. Transpose of a matrix and sorting of names using arrays.

UNIT-III

User-defined Functions,Structures and Unions,Pointers
Programming Exercises for Unit - III: Functions - Recursive functions to find factorial & GCD (Greatest Common Divisor), string operations using pointers and pointer arithmetic. Swapping two variable values. Sorting a list of student records on register number using array of pointers.

UNIT-IV

File Management in C,Dynamic Memory Allocation,Preprocessor
Programming Exercises for Unit - IV: Operations on complex numbers, and to read an input file of marks and generate a result file, sorting a list of names using command line arguments. Copy the contents of one file to another file. Allocating memory to variables dynamically.

TEXT BOOKS
1. Kernighan BW and Dennis Ritchie M, "C programming language", 2nded, Prentice Hall.
2. Yashavant P. Kanetkar, "Let us C", BPB Publications.
3. Herbert Schildt, "C: The Complete Reference", 4th edition, Tata Mcgraw-Hill.
4. Ashok N.Kamthane, "Programming in C", PEARSON 2nd Edition.

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PHYSICS LABORATORY
18PHL01
I Year B. Tech.First Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee's apparatus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Determination of radius of auppature of a Plaooe les foigNewton'srings.
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. Determination of dispersive power of a given material of prism using prism minimum deviation method.
7. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
8. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using sonometer.
10. Determine the rigidity modulus of the given material of the wire using Torsional pendulum.
11. Draw the load characteristic curves of a solar cell.
12. Determination of Hall coefficient of a semiconductor.
13. Determination of voltage and frequency of an A.C. signal using C.R.O.
14. Determination of Forbidden energy gap of Si &Ge.
15. Determination of wavelength of laser source using Diode laser.

Any three experiments are virtual

TEXT BOOK:

1. Engineering physics laboratory manualP.Srinivasarao&K.Muralidhar,Himalaya publications.

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BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB
18EEL01
I Year B. Tech.First Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

LIST OF EXPERIMENTS

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Verification of Thevenin‟s theorem
4. Verification of Norton‟s theorem
5. Parameters of choke coil
6. Measurement of low and medium resistance using volt ampere method
7. OC & SC test of single phase transformer
8. Load test on single phase transformer
9. V-I characteristics of PN junction Diode
10. V-I characteristics of Zener Diode
11. Characteristics of CE Configuration
12. Transfer and Drain Characteristics of JFET
13. Calculation of Ripple factor using Half wave rectifier
14. Calculation of Ripple factor using Full wave rectifier
15. Non linear wave shaping – clippers/clampers

Note: Minimum 10 experiments should be carried.

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PROBLEM SOLVING USING PROGRAMMING LAB
18CSL01
I Year B. Tech.First Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if-elsestatement).

Domestic Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 200	0.50 per unit	
201 – 400	100 plus	0.65 per unit
401 – 600	230 plus	0.80 per unit
601 and above	390 plus	1.00 per unit
Commercial Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 100	0.50 per unit	
101 – 200	50 plus	0.6 per unit
201 – 300	100 plus	0.70 per unit
301 and above	200 plus	1.00 per unit

2. Write a C program to evaluate the following (usingloops):
    a) $1 + x^2/2! + x^4 / 4! + $ …upto tenterms
    b) $x + x^3/3! + x^5/5! + $ … upto ten terms
3. Write a C program to check whether the given numberis
    a) Prime ornot.
    b) Perfect or Abundant orDeficient.
4. Write a C program to display statistical parameters (using one – dimensionalarray).
    a)Mean
    b) Mode
    c)Median
    d) Variance.
5. WriteaCprogramtoreadalistofnumbersandperformthefollowingoperations
    a)Print thelist.
    b) Delete duplicates from thelist.
    c)Reverse thelist.
6. Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message "Element not found in theList".

7. Write a C program to read two matrices and compute their sum andproduct.

8. Write a C program to read list of student names and perform the following operations

   a) To print the list of names.
   b) To sort them in ascending order.
   c) To print the list after sorting.

9. Write a C program that consists of recursive functions to

   a) Find factorial of a given number
   b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.

10.   A Bookshop maintains the inventory of books that are being sold at the shop. The list   includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author, and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed, if it is, then the system displays the book details and request for the number of copies required ,if the requested copies are available the total cost of the requested copies is displayed otherwise the message "required copies not in stock" is displayed. Write a program for the above in structures with suitable functions.

11.   Write a C program to read a data file of students' records with fields(Regno, Name, M1,M2,M3,M4,M5) and write the successful students data (percentage > 40%) to a data file.

12.   Write a C program to read a file as command line argument and count the given word frequency in a file

NUMERICAL METHODS AND ADVANCED CALCULUS
18MA002
I Year B. Tech.Second Semester

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. To learn about some advanced numerical techniques e.g. solving a nonlinear equation, linear system of equations, Interpolation and Approximation techniques.
2. To learn about evaluation of double and triple integrals and their applications.
3. To learn some basic properties of scalar and vector point functions and their applications to line,surface and volume integrals.

Course Outcomes: Students will be able to
1. Solve non-linear equations in one variable and system of linear equations using iteration methods.
2. Choose appropriate interpolation formulae based on the given data.
3. Compute the value of a definite integral using numerical integration techniques.
4. Predict the numerical solution of the derivative at a point from the given initial value problem using appropriate numerical method.
5. Evaluate the double and triple integrals using change of variables.
6. Transform line integrals to surface and surface to volume integrals and evaluate them.

UNIT-I

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton-Raphson method; Useful deductions from the Newton-Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss elimination method, Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi"s iterative method, Gauss-Seidel iterative method.

[Sections: 28.1; 28.2; 28.3; 28.5; 28.6; 28.7.1;28.7.2]. [12 Hours]

UNIT-II

Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton"s interpolation formulae: Newton"s forward interpolation formula, Newton"s backward interpolation formula; Interpolation with unequal intervals; Lagrange"s interpolation formula; Divided differences; Newton"s divided difference formula; Numerical integration; Trapezoidal rule; Simpson"s one-third rule; Simpson"s three-eighth rule; Numerical solution of ODE"s: Introduction; Picard"s method; Euler"s method; Runge-Kutta method.

[Sections:29.1; 29.1-1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1;

32.2; 32.4; 32.7]. [12 Hours]

UNIT-III

Multiple Integrals: Double integrals; Change of order of integration; Double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integrals, Change of variables.

[Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2]. [12 Hours]

UNIT-IV

Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green's theorem in the plane (without proof); Stokes theorem (without proof); Gauss divergence theorem(without proof).

[Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12; 8.13; 8.14; 8.16]   [12 Hours]

TEXT BOOKS
1. B.S.Grewal, "Higher Engineering Mathematics", 44[th]edition, Khanna publishers, 2017.

REFERENCE BOOKS
1. ErwinKreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.
2. N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

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ENGINEERING CHEMISTRY
18CY001
I Year B. Tech.Second Semester

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.
2. To understand the thermodynamic concepts, energy changes, concept of corrosion & its control.
3. With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of knocking and anti-knocking characteristics.
4. With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers.

Course Outcomes: Students will be able to
1. Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2. Apply their knowledge in converting various energies of different systems and protection of different metals from corrosion.
3. Have the capacity of applying energy sources efficiently and economically for various needs.
4. Design economically and new methods of organic synthesis and substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.

UNIT-I

Water chemistry 15hrs

Introduction: water quality parameters
Characteristics: Alkalinity, Hardness **-** Estimation & simple neumerical problems, **Boiler Troubles** - Sludges, Scales, Caustic embrittlement, boiler corrosion, Priming and foaming;
Internal conditioning- phosphate, calgon and carbonate methods.
External conditioning - Ion exchange process & Zeolite proess
WHO Guidelines, Potable water, Sedimentation, Coagulation, Filtration. Disinfection methods: Chlorination, ozonization and UV treatment.
Salinity – Treatment of Brackish water by Reverse Osmosis and Electrodialysis.

UNIT-II 15hrs

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies.Free energy and emf.Cell potentials, the Nernst equation and applications.
Corrosion: Types of corrosion - Chemical or dry corrosion, Electrochemical or wet corrosion; Galvanic, stress, pitting and differential aeration corrosion; Factors effecting corrosion, **Corrosion control** – Cathodic protection, and electro plating (Au)&electoless Ni plating.

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UNIT-III

Fuels   **15hrs**

Classification of fuels; Calorific value of fuels (lower, higher)

Solid fuels: Determination of calorific value (Bomb Calorimeter) & related problems, Coal ranking,

Liquid Fuels: Petroleum refining and fractions, composition and uses. Knocking and anti-knocking Agents, Octane number and Cetane number; Bio fuels- Biodiesel, general methods of preparation and advantages

Gaseous fuels: CNG and LPG,

Flue gas analysis – Orsat apparatus.

UNIT-IV

Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution (SN^1, SN^2), addition (Markownikoff's and anti-Markwnikoff's rules) , elimination (E_1 & E_2), Synthesis of a commonly used drug molecule.(Aspirin and Paracetamol)

Polymers: Conducting polymers: Classification, Intrinsic and Extrinsic conducting polymers and their applications**.** Plastics: Thermoplasts and thermosetting plastics, Bskelite and PVC.

Bio degradable polymers: types, examples-Polyhydroxybuterate(PHB), Polyhydroxybuterate-co-β-hydroxyvalerate (PHBV), applications.

TEXT BOOKS
1. P.C. Jain and Monica Jain, "Engineering Chemistry" DhanpatRai Pub, Co., New Delhi 17th edition (2017).
2. SeshiChawla, "Engineering Chemistry"DhanpatRai Pub, Co LTD, New Delhi 13th edition, 2013.

REFERENCE BOOKS
1. Essential Of Physical Chemistry by ArunBahl, B.S. Bahl, G.D.Tuli, byArunBahl, B.S. Bahl, G.D.Tuli, Published byS Chand Publishers, 12th Edition, 2012.
2. Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).
3. Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015

ENGINEERING MECHANICS - II
18ME203
I Year B. Tech.Second Semester

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)		:	50

Course Objectives:

To introduce the students to the principles of particle and rigid body dynamics in terms of kinematics and kinetics, with emphasis on the analysis and application to practical Engineering problems limited to motion in a plane.

Course Outcomes: Students will be able to

1. Develop relationships between different parameters of motion of a particle in a plane to analyse rectilinear and curvilinear motions
2. Analyze the motion parameters and forces acting on a particle by relating them using Newton's laws of motion, dynamic equilibrium, work & energy and impulse & momentum principles.
3. Find the moment of inertia of material bodies
4. Develop relationships between different parameters of motion to analyse bodies undergoing fixed axis rotation and general plane motion
5. Analyze the motion parameters and forces acting on a body by Newton's laws of motion, dynamic equilibrium and work & energy principles

UNIT-I

Kinematics of Particle: Rectilinear Translation:
Introduction to Dynamics – Displacement, Velocity and Acceleration – Graphical representations – Motion with uniform acceleration – Motion with variable acceleration.

Kinematics of Particle: Curvilinear Translation:
Introduction – Position vector, Velocity and Acceleration – Components of motion: Rectangular and Normal & tangential.

Relative Motion:
Introduction – Relative motion between two particles: Position, Velocity and Acceleration.

UNIT-II

Kinetics of Particle: Equations of motion
Equations of rectilinear motion – D'Alembert's principle in rectilinear motion - Equations of curvilinear motion: Rectangular components and Normal & tangential components - D'Alembert's principle in curvilinear motion.

Kinetics of Particle: Work and Energy – Impulse and Momentum – Impact
Introduction – Principle of work and energy – Potential energy and conservative forces – Principle of conservation of energy – Principle of impulse and momentum – Conservation of momentum – Direct central impact.

UNIT-III

Moment of Inertia of Material bodies:

Moment of inertia of a rigid body – Moment of inertia of laminas – Moment of inertia of three dimensional bodies: Solid right circular cone, Solid cylinder and Sphere

Kinematics of Rigid Body:

Introduction – Rotation – Parameters of motion of a body rotating about a fixed axis – General plane motion – Absolute and relative velocity in plane motion – Instantaneous centre of rotation in plane motion.

UNIT-IV

Kinetics of Rigid Body: Equations of motion

Introduction – Equations of motion – Relation between translatory motion and rotary motion of a body in plane motion – D'Alembert's principle in plane motion.

Kinetics of Rigid Body: Work and Energy

Kinetic energy of a rigid body – Work of the forces acting on a rigid body – Principle of work and energy for a rigid body – Principle of conservation of energy.

TEXT BOOKS
1. Engineering Mechanics (in SI units) by S Timoshenko, D H Young, J V Raoand SukumarPati, McGraw Hill Education, 5th edition,2016.
2. Engineering Mechanics: Statics and Dynamics by A K Tayal, Umesh publications, 14th edition,2015.

REFERENCE BOOKS
1. Vector mechanics for Engineers: Statics and Dynamics by Ferdinand Beer, E Russell Johnston Jr, David Mazurek, Phillip Cornwell, Brian Self and SanjeevSanghi, McGraw Hill Education, 11th edition,2017.
2. Engineering Mechanics: Statics and Dynamics by R C Hibbeler, Pearson, 14thedition, 2017.
3. Engineering Mechanics (Statics) by J L Meriam and L G Kraige, Wiley student edition, 7th edition.

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ENVIRONMENTAL STUDIES
18CE001
I Year B. Tech.Second Semester

Lectures	4	Tutorial	0	Practical	0	Credits	2
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. To develop an awareness, knowledge,   and appreciation for the natural environment.
2. To understand different types of ecosystems exist in nature.
3. To know our biodiversity.
4. To understand different types of pollutants present in Environment.
5. To know the global environmental problems.

Course Outcomes: Students will be able to
1. Develop an appreciation for the local and natural history of the area.
2. Hope for the better future of environment in India which is based on many positive factors like Biodiversity, successive use of renewable energy resources and other resources, increasing number of people's movements focusing on environment.
3. Know how to manage the harmful pollutants.
4. Gain the knowledge of Environment.
5. Create awareness among the youth on environmental concerns important in the long-term interest of the society

UNIT-I

Introduction: Definition, Scope and Importance, Need for public awareness. Ecosystems: Definition, Structure and Functions of Ecosystems, types - Forest, Grassland, Desert, Aquatic
(Marine, pond and estuaries).   *6 periods*
Biodiversity: Definition and levels of Biodiversity; Values of Biodiversity - Consumptive, Productive, Social, Aesthetic, Ethical and Optional; Threats and Conservation of Biodiversity; Hot Spots of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation. *Chipko movement case study*   *6 periods*

UNIT-II

Natural resources: Land: Land as a resource, Causes and effects of land degradation - Soil erosion, Desertification. **Forest**: Use of forests, Causes and effects of deforestation, Afforestation, Mining - benefits and problems. **Water**: Uses, floods and drought, Dams - benefits and problems.

Energy: Importance of energy, Environmental Impacts of Renewable and Non-renewable energy resources. *Silent Valley Project and Narmada BachaoAndolan case studies8 periods*

Sustainability: Definition, Concept and Equitable use of resources for sustainable development; Rain water harvesting and Watershed management. Fieldwork on Rain water harvesting and Watershed management.*6 periods + 6 hours field work/Demonstration*

UNIT-III

Pollution: Definition; Causes, effects and control of air, water and nuclear pollution; *Chernobyl Nuclear Disaster* case study; Solid Waste: urban, Industrial and hazardous wastes; Integrated waste management - 3R approach, composting and vermicomposting.

12 periods

Environmental acts: Water and air (Prevention and Control of pollution) acts, Environmental protection act, Forest Conservation act.   *6 periods*

UNIT-IV

Environmental issues: Green house effect & Global warming, Ozone layer depletion, Acid rains, Green Revolution, Population Growth and environmental quality, Environmental Impact Assessment.Environmental Standards (ISO 14000, etc.)   *12 periods*

Case Studies: Bhopal Tragedy, Mathura Refinery and TajMahal, and Ralegan Siddhi (Anna Hazare).   *6 periods*

Field work: Visit to a local area to document environmental assets – Pond/Forest/Grassland. Visit to a local polluted site- Urban and industry/ Rural and Agriculture.   *6 hrs.*

TEXT BOOKS
1. "Environmental Studies" by Benny Joseph, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. "Comprehensive environmental studies"- JP Sharma, Laxmi Publications.
3. Text Book of environmental Studies – ErachBharucha

REFERENCE BOOKS
1. "Environmental studies", R.Rajagopalan, Oxford University Press.
2. "Introduction to Environmental Science", Anjaneyulu Y, B S Publications
3. "Environmental Science", 11th Edition – Thomson Series – By Jr. G. Tyler Miller.

COMMUNICATIVE ENGLISH
18EL001
I Year B. Tech.Second Semester

Lectures	3	Tutorial	0	Practical	0	Credits	2
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)		:	50

UNIT-I

1.1 **Vocabulary Development**: Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes

1.2 **Essential Grammar:** Prepositions, Conjunctions, Articles

1.3 **Basic Writing Skills**: Punctuation in writing

1.4 **Writing Practices**: Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT-II

2.1 **Vocabulary Development**: Synonyms and Antonyms

2.2 **Essential Grammar**: Concord, Modal Verbs, Common Errors

2.3 **Basic Writing Skills**: Using Phrases and clauses

2.4 **Writing Practices**: Hint Development, Essay Writing

UNIT-III

3.1 **Vocabulary Development**: One word Substitutes

3.2 **Essential Grammar**: Tenses, Voices

3.3 **Basic Writing Skills**: Sentence structures (Simple, Complex, Compound)

3.4 **Writing Practices**: Note Making

UNIT-IV

4.1 **Vocabulary Development**: Words often confused

4.2 **Essential Grammar**: Reported speech, Common Errors

4.3 **Basic Writing Skills**: Coherence in Writing: Jumbled Sentences

4.4 **Writing Practices**: Paraphrasing &Summarising

REFERENCE BOOKS

❖ Communication Skills, Sanjay Kumar &PushpaLatha. Oxford University Press:2011.
❖ Practical English Usage, Michael Swan. Oxford University Press:1995.
❖ Remedial English Grammar, F.T.Wood. Macmillan:2007.
❖ Study Writing, Liz Hamplyons& Ben Heasley. Cambridge University Press:2006

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ENGINEERING GRAPHICS
18MEL01
I Year B. Tech. Second Semester

Lectures	1	Tutorial	0	Practical	4	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. Clear picture about the importance of engineering graphics in the field of engineering
2. The drawing skills and impart students to follow Bureau of Indian Standards
3. To give an idea about Geometric constructions, Engineering curves, orthographic projections and pictorial projections
4. Imagination skills about orientation of points, lines, surfaces and solids
5. Basic drafting skills of AutoCAD

Course Outcomes: After completion of the course the students will be able to
1. Draw projections of points and projections of lines using Auto CAD
2. Plot projections of surfaces like circle, square and rhombus
3. Plot the Projections of solids like Prisms and pyramids
4. Convert the of Orthographic views into isometric views of simple objects
5. Generate the of pictorial views into orthographic views of simple castings

UNIT-I

INTRODUCTION: Introduction to Drawing instruments and their uses, geometrical construction procedures
INTRODUCTION TO AUTOCAD:
 Basics of sheet selection, Draw tools, Modify tools, dimensioning
METHOD OF PROJECTIONS: Principles of projection - First angle and third angle projectionof points. Projection of straight lines.Traces of lines.

UNIT-II

PROJECTIONS OF PLANES: Projections of plane figures: circle, square, rhombus, rectangle, triangle, pentagon and hexagon.

UNIT-III
PROJECTIONS OF SOLIDS: Projections of Cubes, Prisms, Pyramids, Cylinders and Cones Inclined to one plane.

UNIT-IV

ISOMETRIC PROJECTIONS: Isometric Projection and conversion of Orthographic views into isometric views. (Treatment is limited to simple objects only).

UNIT-V

ORTHOGRAPHIC PROJECTIONS: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings).

TEXT BOOKS

1. Engineering Drawing with AutoCAD by Dhananjay M. Kulkarni (PHI publication)
2. Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand). (First angle projection)

REFERENCE BOOKS

1. Engineering Drawing by Dhananjay A Jolhe, Tata McGraw hill publishers
2. Engineering Drawing by Prof.K.L.Narayana& Prof. R.K.Kannaiah.

ENGINEERING CHEMISTRY LABORATORY
18CYL01
I Year B. Tech.Second Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

LIST OF EXPERIMENTS

1. **Introduction to Chemistry Lab** (the teachers are expected to teach fundamentals likeCalibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. anderror, accuracy, precision, theory of indicators, use of volumetric titrations).

2. **Volumetric Analysis:**
   a. Estimation of Washing Soda.
   b. Estimation of Active Chlorine Content in Bleaching Powder
   c. Estimation of Mohr's salt by permanganometry.
   d. Estimation of given salt by using Ion-exchange resin using Dowex-50.

3. **Analysis of Water:**
   a. Determination of Alkalinity of Tap water.
   b. Determination of Total Hardness of ground water sample by EDTA method
   c. Determination of Salinity of water sample

4. **Estimation of properties of oil:**
   a. Estimation of Acidic Value.
   b. Estimation of Saponification Value.

5. **Preparations:**
   a. Preparation of Soap
   b. Preparation of Urea-formaldehyde resin
   c. Preparation of Phenyl benzoate

6. **Demonstration Experiments (Any two of the following):**
   a. Determination of p^H of given sample.
   b. Determination of conductivity of given sample by conductometer.
   c. Potentiometric Determination of Iron.

TEXT BOOK:

1. Practical Engineering Chemistry by K.Mukkanti, Etal, B.S. Publicaitons, Hyd, 2009.
2. Inorganic quantitative analysis, Vogel, 5th edition, Longman group Ltd. London, 1979.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R.n.Goyal and HarrmendraGoel.
2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

ENGLISH COMMUNICATION SKILLS LABORATORY
18ELL01
I Year B. Tech.Second Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

UNIT-I

1.1 Listening Skills; Importance – Purpose- Process- Types
1.2 Barriers to Listening
1.3 Strategies for Effective Listening

UNIT-II

2.1 Phonetics; Introduction to Consonant, Vowel and Diphthong sounds
2.2 Stress
2.3 Rhythm
2.4 Intonation

UNIT-III

3.1 Formal and Informal Situations
3.2 Expressions used in different situations
3.3 Introducing Yourself & Others-Greeting & Parting-Congratulating-Giving
    Suggestions & Advices-Expressing Opinions-Inviting People-Requesting-Seeking
    Permission-Giving Information- Giving Directions- Sympathizing- Convincing
    People- Complaining &   Apologizing-Thanking Others- Shopping- Travelling-
    Conversational Gambits

UNIT-IV

4.1 JAM Session
4.2 Debates
4.3 Extempore

REFERENCE BOOKS:

❖ Communication Skills, Sanjay Kumar and PushpaLata. Oxford University Press. 2011
❖ Better English Pronunciation, J.D. O‟ Connor. Cambridge University Press:1984
❖ New Interchange (4rth Edition), Jack C Richards. Cambridge University
  Press:2015 English Conversation Practice, Grant Taylor. McGraw Hill:2001

SOFTWARE:

❖ Buzzers for conversations, New Interchange series
❖ English in Mind series, Telephoning in English
❖ Speech Solutions, A Course in Listening and Speaking

WORKSHOP PRACTICE
18MEL02
I Year B. Tech.Second Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. To impart student knowledge on various hand tools for usage in engineering applications.
2. Be able to use analytical skills for the production of components.
3. Design and model different prototypes using carpentry, sheet metal and welding.
4. Make electrical connections for daily applications.
5. To make student aware of safety rules in working environments.

Course Outcomes: After completion of this course student should be able to:
1. Make half lap joint, Dovetail joint and Mortise &Tenon joint
2. Produce Lap joint, Tee joint and Butt joint using Gas welding
3. Prepare trapezoidal tray, Funnel and T-joint using sheet metal tools
4. Make connections for controlling one lamp by a single switch, controlling two lamps by a single switch and stair case wiring.

SYLLABUS:

1. Carpentry
   a. Half Lap joint
   b. Dovetail joint
   c. Mortise &Tenon joint
2. Welding using electric arc welding process/gas welding
   a. Lap joint
   b. Tee joint
   c. Butt joint
3. Sheet metal operations with hand tools
   a. Trapezoidal tray
   b. Funnel
   c. T-joint
4. House wiring
   a. To control one lamp by a single switch
   b. To control two lamps by a single switch
   c. Stair-case wiring

TEXT BOOKS:

1. P.Kannaiah and K.L.Narayana, Workshop Manual, SciTech Publishers, 2009.
2. K. Venkata Reddy, Workshop Practice Manual, BS Publications, 2008.

STRENGTH OF MATERIALS - I
18ME301
II Year B. Tech. (Mech) Third Semester

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. Classification of the stresses into various categories and define the elastic properties of Materials
2. Computations of stress and strain intensities caused by applied loads in simple and compound sections and temperature changes
3. Determination of the shear force and bending moment and draw the shear force and bending moment diagrams for different beams and different loads
4. Explain the structural behaviour of members subjected to torque, Calculate twist and stress induced in shafts subjected to bending and torsion
5. Derivation of equations for principal stress and maximum in-plane shear stress and calculation of their magnitude and direction. Draw Mohr circle for plane stress system and interpret this circle.

Course Outcomes:
1. To define stress strain diagram and various points on it and define the types of stresses.
2. To analyse the bars under axially loaded members of statically determinate and statically indeterminate members.
3. To calculate the power transmitted by circular shafts
4. To draw the SF and BM diagrams and analyse the bending stresses and shear stresses.
5. To draw the Mohr's circle for plane stress for principal stresses and maximum shear stresses.

UNIT-I

TENSION, COMPRESSION AND SHEAR: Introduction to Mechanics of materials, normal stress and strain, stress strain diagram for mild steel, elasticity and plasticity, linear elasticity, Hooke's law and Poisson's ratio, shear stress and strain, volumetric strain and bulk modulus, allowable stresses and allowable loads. (9)
AXIALLY LOADED MEMBERS: Introduction, changes in lengths of axially loaded members, changes in lengths under non uniform conditions. (6)

UNIT-II

STATICALLY INDETERMINATE AXIALLY LOADED MEMBERS: Statically indeterminate structures, thermal effects, misfits and pre strains, strain energy. (8)

TORSION: Introduction, torsion of circular bars, non-uniform torsion, relationship between E and G, transmission of power by circular shafts, strain energy in torsion. (7)
UNIT-III

SHEAR FORCE AND BENDING MOMENT: Introduction, Types of Beams, Loads and Reactions. Shear force and bending moment, relationships between load, Shear force and bending moment, S.F. and B.M. diagrams.   (15)

UNIT-IV

STRESSES IN BEAMS: Introduction, normal strains and stresses in beams. Shear stresses in beams of rectangular cross section, shear stresses in beams of circular cross section.   (8)

ANALYSIS OF STRESS AND STRAIN: Introduction, plane stress, principal stresses and maximum shear stresses, Mohr's circle for plane stress, Hooke's law for plane stress.   (7)

TEXT BOOKS
1. 'Mechanics of Materials' by James M Gere, Barry j. Goodno, Cengage learning.
2. Strength of Materials by Dr. Sadhu singh, Khanna publications.

REFERENCE BOOKS
1. 'Strength of materials' by G.H. Ryder: MacMillan India Ltd. publishers.
2. 'Mechanics of Materials' by Beer and Johnston
3. 'Strength of Materials' by L.S.Srinath
4. 'Applied strength of materials' by RobortL.Mott

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PROFISSIONAL ETHICS & HUMAN VALUES
18ME302
II Year B.Tech. (Mech) Third Semester

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. Understand the Engineering Ethics and uses of ethical theories
2. Understand social responsibilities and rights
3. Familiar with Global issues like Multinational Corporations-Environmental Ethics-Computer Ethics-Weapons Development-Engineers As Managers -Consulting Engineers-Engineers as Expert Witnesses And Advisors-Moral Leadership Sample Code Of Ethics Like ASME, ASCE, IEEE, Institution Of Engineers(India), Indian Institute Of Materials Management, Institution Of Electronics and Telecommunication Engineers (IETE), India Etc.

Course Outcomes:
Upon successful completion of the course, the student will be able:
1. To create awareness on professional ethics and Human Values

2. To create awareness on Engineering Ethics providing basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues.

3. To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards

4. To inculcate knowledge and exposure on Safety and Risk, Risk Benefit Analysis and have an idea about the Collective Bargaining, Confidentiality, Professional, Employee, Intellectual Property Rights

UNIT-I

Human Values: Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing timeCo-Operation, Commitment, Empathy, Self Confidence, Character, Spirituality   (14)

UNIT-II

Engineering Ethics: Senses Of 'Engineering Ethics, Variety of Moral Issues, Types of Inquiry,Moral Dilemmas, Moral Autonomy, Kohlberg's Theory, Gilligan's Theory, Consensus and controversy, Professions and Professionalism, ProfessionalIdeals and Virtues, Theories about Right Action.   (14)

UNIT-III

Engineering as Social Experimentation: Engineering as Experimentation, Engineers as Responsible Experimenters, Safety, Responsibility and Rights: Safety and Risk – Assessment of Safety and Risk, RiskBenefit Analysis and Reducing Risk.
Collegiality and Loyalty, Respect For Authority, Collective Bargaining, Confidentiality, Conflicts Of Interest, Occupational Crime, Professional Rights, Employee Rights, Intellectual Property rights (IPR).   (20)

UNIT-IV

Global Issues:
Multinational Corporations, Environmental Ethics, Computer Ethics, Weapon Development,Engineers as Managers, Consulting Engineering,Engineering as Expert Witnesses and Advisors,Moral leadership, Sample codes of Ethics like ASME, ASCE, IEEE, and Institutionof Engineers(India), Indian institute of material management, Institution of Electronics and
Telecommunication Engineers (IETE), India etc.,

TEXT BOOKS
1. Govindarajan. M, Natarajan. S, Senthilkimar.V.S, Engineering Ethics, Phi, 2004.
2. Mike Martin and Roland Schinzinger, Ethics In Engineering, McGraw Hill, New York 1996.
3. M.P.Raghavan, ProfessiionalEhics and Human Values, Scitech Publications (India)Pvt.ltd., 2009.

REFERENCE BOOKS
1. Charles D Fleddermann, Engineering Ethics, Prentice Hall, New Jersey, 2004.
2. Charles E Harris, Michael S Pritchard and Michael J Robins, Engineering Ethics Concepts and Cases, Thomson Learning, United States, 2000.
3. John R Boatright, Ethics and The Conduct Of Business, Phi, New Delhi, 2003.
4. Edmund G SeebauerAnd Robert L Barry, Fundamentals Of Ethics For Scientists AndEngineering, Oxford University Press, 2001.

THERMODYNAMICS
18ME303
II Year B.Tech. (Mech) Third Semester

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. To Understand the fundamental concepts of Thermodynamics
2. To acquire the knowledge about the laws of Thermodynamics
3. To learn the principles of Work and Heat energy
4. To Understand the Concepts of Entropy and Availability
5. To analyse the Vapour power cycles and differentiate the Phase diagrams of the steam and usage of Steam tables

Course Outcomes:
Upon successful completion of the course, the student will be able
1. To explain the differences between Open system and Closed system and to analyse the work and heat interactions for various processes.
2. To Define the fundamentals of first law and second law of thermodynamics and their applications to the various systems
3. To Evaluate the Entropy changes for various processes and determine the reversibility or irreversibility of a process
4. To understand the principle of Rankine cycle and methods to improve its efficiency.
5. To learn the process of Steam generation and calculate the Properties of Steam using Steam tables and Mollier chart.

UNIT-I

FUNDAMENTAL CONCEPTS AND DEFINITIONS: Introduction, Macroscopic and microscopic points of view, Thermodynamic system and control volume, Perfect gases, properties and state of a substance, Thermodynamic equilibrium and Quasi-static Process, Concept of Continuum, thermodynamic path, cycle, Path function and Point function, Zeroth law of thermodynamics, concept of temperature.   (7)
WORK AND HEAT: Definitions and comparisons, Displacement work, Displacement work in various Quasi-Static processes, Forms of Work transfer.
FIRST LAW OF THERMODYNAMICS: First law of thermodynamics for a closed system undergoing a cycle and a change of state, Energy- A property of the system, First law analysis for a closed system (Non-flow processes), Internal energy and Enthalpy.   (8)

UNIT-II

FIRST LAW OF THERMODYNAMICS FOR FLOW SYSTEMS: First law of thermodynamics for a control volume, Steady flow energy equation and its application to engineering equipment, Limitations of first law of thermodynamics, PMM of first kind.   (7)
SECOND LAW OF THERMODYNAMICS: Heat engines and Refrigerators, Statements of Second law, PMM of second kind, reversible and irreversible processes, factors that render a process irreversible, Carnot cycle and Carnot theorem and its corollaries, Thermodynamic temperature scale.   (8)

UNIT-III

ENTROPY: Inequality of Classius, Entropy change in reversible process, T-ds relations, Entropy change of a system during an irreversible process, Principle of increase of entropy, Applications, Entropy change of an ideal gas. (8)

AVAILABILITY AND IRREVERSIBILITY: Available and unavailable energy, Availability Function for a non-flow Process, Availability Function of Flow Processes, Irreversibility, Second law efficiency, Helmholtz & Gibb's function, Elementary treatment of Third law of thermodynamics. (7)

UNIT-IV

PURE SUBSTANCE: Definition, process of steam generation, P-v, T-s and h-s diagrams, properties of saturated and superheated steam, Use of Steam Tables, Mollier chart. (7)

VAPOR POWER CYCLES: Rankine cycle, Effect of pressure and temperature on the Rankinecycle, reheat cycle, regenerative cycle. (8)

TEXT BOOKS
1. Engineering Thermodynamics- P.K.Nag, TMH, New Delhi.
2. Thermal Science and Engineering- D.S.kumar, S.K.Katariapubl, New Delhi.
3. Thermodynamics—Rajput, LaxmiPubl, New Delhi.

REFERENCE BOOKS
1. Fundamentals of Engineering Thermodynamics-Rathakrishnan-PHI, New Delhi.
2. Thermodynamics -- J.P.Holman, MGH, New York.
3. Engineering Thermodynamics—Cengel& Boles, TMH

FLUID MECHANICS & HYDRAULIC MACHINES
18ME304
II Year B.Tech. (Mech) Third Semester

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:

To make the students to perceive
1. Understanding the properties of fluids, principles of buoyancy, flow, force and head calculations.
2. Evaluation of types of fluid flow and pipe flow.
3. Principles of operation of different types of hydraulic machinery.

Course Outcomes:

After completion of the course the student will be able to:
1. Analyze the fluid properties to solve flow, force and velocity problems.
2. Evaluate the flow characterizing in static and dynamic nature of flow
3. Apply fluid flow and dynamics in solving problems in hydraulic machines.

UNIT-I

INTRODUCTION: Definition of fluid, Properties of a fluid – density, specific weight, specific gravity, viscosity, compressibility, surface tension, capillarity, vapor pressure, Classification of fluid (4)

FLUID STATICS: Pressure, variation of pressure in a fluid, measurement of pressure – simple and differential manometers, pressure head, Pascal's law, Total pressure and center of pressure on plane surfaces, Introduction to Buoyancy and Metacentric height. (5)

FLUID KINEMATICS: Velocity and acceleration of fluid particle, types of fluid flow, Description of flow pattern, Rotational and irrotational flows, velocity potential, stream function, flow net, continuity equation in Cartesian coordinates. (6)

UNIT-II

FLUID DYNAMICS: Introduction, Euler's equation of motion, Bernoulli's equation, Pitot tube, venturimeter, Introduction to orifice- various coefficients of an orifice. Impulse momentum Principle, Equation and Application - Force on pipe bend. (7)

FLOW THROUGH PIPES: Reynolds experiment, Darcy Wiesbach equation, minor losses, pipes in series and parallel, transmission of power through a pipe, water hammer. Laminar flow through a circular pipe, Hagen-Poiseuille law. (8)

UNIT-III

INTRODUCTION: Classification of fluid machines, angular momentum principle.

IMPACT OF JETS: Introduction, Force exerted by a fluid jet on stationary and moving flat plate and curved vanes, flow over radial curved vanes. (6)

HYDRAULIC TURBINES: Heads and efficiencies of a turbine, Classification of turbines, Pelton, Francis and Kaplan turbines- Working, proportions of turbines, Numerical problems. Introduction to draft tube theory. (7)

PERFORMANCE OF TURBINES: Performance under unit quantities, Performance under specific conditions - Specific speed. Performance characteristics curves, Cavitation in turbines- Thoma's cavitation factor. (2)

UNIT-IV

RECIPROCATING PUMPS: Types, Working principle, Power required by a Reciprocating pump, Coefficient of discharge, Slip and negative slip, Effect of Acceleration of piston on velocity and pressure in suction and delivery pipes, Indicator diagram, Maximum speed of a reciprocating pump. Introduction to Air vessels.(8)
CENTRIFUGAL PUMPS: Types, Working, Reciprocating vs. Centrifugal pump, Work done by impeller, Head of a pump, losses and efficiencies, Minimum starting speed, Specific speed, Multistage pumps, Pumps in parallel, Performance characteristic curves, limitation of suction lift, NPSH, Cavitation. (7)

TEXT BOOKS
1. Hydraulics and fluid mechanics -P.N. Modi&S.M.Seth, Standard Book House, New Delhi.
2. Fluid Mechanics and hydraulic machines-R.K.Bansal

REFERENCE BOOKS
1. Fluid Mechanics and Fluid machines – Agarwal, TMH.
2. Fluid mechanics and fluid power engineering - D.S.Kumar, SK Kataria& Sons, New Delhi.
3. Fluid mechanics including Hydraulic machines - A.K.Jain. 4. Fluid Mechanics-K.L.Kumar

BASIC MANUFACTURINGPROCESSES
18ME305
II Year B. Tech. (Mech) Third Semester

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. To enable students to understand basic manufacturing processes like casting, welding and Metal Forming
2. To learn various aspects of different manufacturing techniques such as casting methods, welding methods and Metal Working Process
3. To have a broad knowledge to design a casting process and design for punching operations.
4. Understand the Reasons for Defects in a Particular Manufacturing Process and Remedies
5. Calculation of power and Design Requirements in sheet metal and Casting respectively

Course Outcomes:
Upon successful completion of the course, the student will be able to
1. Recommend the particular manufacturing process required to be selected for a specific engineering application.
2. Determine the material properties with respect to manufacturing Process
3. Select a Specific Process to a minimize Defects among different Manufacturing Processes.
4. Understand and Calculate the Dimensions of Pattern, riser, runner etc.,
5. Understand and calculate the power requirements for sheet metal operation

UNIT-I

METAL CASTING: Introduction, advantages of Casting method, pattern types, materials and allowances. Sand moulding procedure, Moulding materials and equipment.Preparation, controlandtesting of moulding sands.   (15)

UNIT-II
GATING DESIGN: Design Considerations and problems.

SPECIAL CASTING METHODS: Permanent Mould Casting, Die Casting, Centrifugal casting, Investment casting, shell moulding, CO_2 process and continuous casting. Fettling of castings, casting defects: causes, remedies and testing.   (15)

UNIT-III
WELDING: Gas and arc welding - Principles of oxy-acetylene welding, oxyacetylene flame cutting, MMAW (Manual metal arc welding), TIG, MIG, submerged arc welding. Resistance welding principles - Butt welding, Spot welding, Seam welding.Thermit Welding, Electro slag welding. Laser beam welding. Brazing & Soldering, welding defects - causes and remedies.   (15)

UNIT-IV

METAL WORKING PROCESSES: Introduction, Hot and Cold working of metals. Rolling, Forging, Extrusion, Tube making, Swaging, Spinning, Coining, Embossing and Wire drawing.   (6)

SHEET METAL WORKING OPERATIONS: Introduction, Types of Sheet metal working operations, Blanking and Punching operations, Clearance and shear as applied to Punching/Blanking operations, Simple related problems, High energy rate forming of metals, Bending, deep drawing.   (9)

TEXT BOOKS
1. Manufacturing Technology-Vol- I by PN Rao, TMH
2. Workshop Technology Vol.1 by S.K.HazraChowdary. Khanna Publishers
3. A course in Work shop technology, Vol-I by B.S.Raghuvanshi, Dhanpatrai& sons.

REFERENCE BOOKS
1. Welding Technology by Little, TMH
2. Principles of Metal Casting by Heine, Loper, Rosenthal, TMH.
3. Manufacturing Engineering & Technology, Kalpakjian, Pearson Education / PHI
4. Material Science and Metallurgy - R. B. Choudary -Khanna Pub.

CONSTITUTION OF INDIA
18ME307
II Year B.Tech. (Mech) Third Semester

Lectures	2	Tutorial	0	Practical	0	Credits	0
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:

The constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the part III of the constitution. The Parliament of India has been empowered to amend the constitution under Article 368, however, it cannot use this power to change the " basic structure" of the constitution, which has been ruled and explained by supreme court of India in its historical judgments. The constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "Static" and therefore the constitution of India has also been amended more than one hundred times. These amendments reflect, political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the next of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

Course Contents:

1. Meaning of the constitution law and constitutionalism.
2. Historical perspective of the Constitution of India.
3. Salient features and characteristics of the constitution of India.
4. Scheme of the fundamental rights.
5. The scheme of the fundamental duties and its legal status.
6. The Directive principles of state policy- its importance and implementation.
7. Federal structure and distribution of legislative and financial powers between the union and the states.
8. Parliamentary form of government of India – the constitution powers and status of the president of India.
9. Amendment of constitutional powers and procedure.
10. The historical perspectives of the constitutional amendments in India.

11. Emergency provisions: National Emergency, President Rule, Financial Emergency.
12. Local Self Government – constitutional scheme in India.
13. Scheme of the Fundamental Right to Equality.
14. Scheme of the Fundamental Right to certain Freedom under Article 19.
15. Scope of the Right to Life and Personal Liberty under Article 21.

TEXT BOOKS
1. Introduction to constitution of India, D.D.Basu, Lexis Nexus
2. The constitution of India, P.M.Bhakshi, Universal law publishing

STRENGTH OF MATERIALS & FLUID MECHANICS LAB
18MEL31
II Year B. Tech. (Mech) Third Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. Study the shear behaviour of mild steel.
2. To know deflection formula and application to find 'E'.
3. To know the fixed support characteristics and applications of the deflection formula to calculate E''.
4. Verify the deflection formula for a helical spring.
5. To study the torsion formula and application.
6. To know about impact strength.
7. To know about B.H.N. and R.H.N.
8. To study the elastic properties.
9. To understand the flow measurements in a pipe and tanks.
10. To identify the various types of flow in pipe.
11. To determine the energy losses in pipe.
12. To verify the Bernoulli's Energy equation.
13. To study the characteristics of turbines.
14. To study the characteristics of pumps.

Course Outcomes:
After completion of the course student will be able to
1. Calculate shear strength of material familiar with U.T.M.
2. Distinguish between various types of beams.
3. State the various features of supports and importance of 'E'.
4. Analyze rigidity modulus and analysing deflection formula for spring.
5. State the torsion formula and the application.
6. AnalyzeCharpy test and calculate impact strength.
7. Determination of B.H.N. and R.H.N.
8. Calculate the elastic properties in tension.
9. Measure discharge in pipes and identification of type of flow.
10. Verify the Bernoulli's equation.
11. Determine the energy loss in conduits.
12. Evaluate the characteristics of turbines.
13. Evaluate the characteristics of pumps.

LIST OF EXPERIMENTS
Strength of Materials Lab

1. Determination of shear strength on mild steel bar using UTM.
2. Find young's modulus using simply supported beam on steel and wood.
3. Find young's modulus using cantilever beam on steel.
4. Calculate rigidity modulus for the spring by using deflection formula.
5. Evaluate shear modulus by conducting torsion test on a mild steel bar.
6. Charpy test.
7. Conduct hardness tests (B.H.T & R.H.T.) on steel and brass specimens.
8. Tension test on U.T.M. to find elastic properties.

Fluid Mechanics Lab

1. Verification of Bernoulli's theorem
2. Venturimeter Determination of coefficient of discharge
3. Determination of friction factor for pipes of different materials
4. Determination of loss of head in pipes due to bends, sudden contractions and sudden expansion.
5. Measurement of force due to impact of jets on vanes of different types.
6. Performance study on Pelton turbine
7. Performance studies on single acting reciprocating pump
8. Performance studies on single stage centrifugal pump

Note: A minimum of 6 experiments shall be done and recorded from each lab.

BASIC MANUFACTURING PROCESSES LAB
18MEL32
II Year B. Tech. (Mech) Third Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)		:	50	

Course Objectives:

At the end of course students will able to :
1. Analyse the thermal, metallurgical aspects during solidification in casting.
2. Design the gating and riser system needed for casting and requirements to achieve defect free casting
3. To understand the basic geometry of pattern making and their application.
4. To gain the knowledge of Fitting and Turning operations

Course Outcomes:
1. Make Solid and split pattern
2. Making of Moulds for Stepped Cone Pulley, Hand Wheel, Bush.
3. Making of Fits like Dovetail, Square,Triangular,Semi-circular.
4. Performing of Turning Operations like Taper,plain,step, Threading, Knurling and Contour Turning

Course Content:

PATTERN MAKING: Solid pattern, Split pattern.

MOULDING: Stepped cone pulley, Hand wheel, Bush.

FITTING: Four Standard Exercises

TURNING: Plain, Step and Taper turning, Right-hand and Left-hand threads, Eccentric turning, Knurling and contour turning

COMPUTER AIDED DRAFTING AND MODELLING LAB
18MEL33
II Year B. Tech. (Mech) Third Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:

1. To understand the working of the software and different commands
2. To enable the students create 3D models.
3. To design assemblies of various products.
4. To generate orthographic views of parts and assemblies.

Course Outcomes:

After completing the course, the student should be able to:

1. Execute steps required for modelling 3D objects.
2. Use isometric views and dimensioning of part models.
3. Execute the steps for assembling the parts of a product.
4. Execute the steps required for generating the orthographic views of parts and products.

Course Content:

3D modelling using any of the modelling packages like CATIA, Pro/ENGINEER, NX, Solid Works, Ideas, Autodesk Inventor etc.
List of Modules to be Covered:

1. Sketcher
2. Part Modelling
3. Assembly Modelling Of Stuffing Box and Screw Jack.
4. Drawing Module for creating the orthographic views of Stuffing box and Screw Jack

TEXT BOOKS

1. A Text book of "Machine Drawing" by K. L. Narayana, P. Kannaiah, K. Venkata Reddy.

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PROBABILITY AND STATISTICS
18MA003
II Year B.Tech. (Mech) Fourth Semester

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
Course Outcomes:
Upon successful completion of the course, the student will be able

UNIT-I
Probability Densities: Continuous Random Variables, Normal Distribution, Normal Approximation to the Binomial Distribution, Uniform Distribution, Gamma Distribution, Beta Distribution, Joint Distributions-Discrete and Continuous.The Central Limit Theorem, distributions of the sample mean and the sample variance for a normal population, Chi-Square, t and F distributions.   (12)

UNIT-II
Inferences Concerning Means: Point Estimation, Interval Estimation, Tests of Hypotheses, Null and alternative hypotheses and p-value of a test.Student's t-Tests concerning mean-one sample, two sample and paired sample t-tests.   (9)

UNIT-III
Analysis of Variance: Analysis of Variance (ANOVA) for comparing the means of k (>2) groups- one way and two –way ANOVA. Multiple comparison tests for post-hoc analysis- Duncan's, Tukey's and Dunnet's test and their applications.   Outline of application of ANOVA for industrial experiments.   (9)

UNIT-IV
Multivariate Analysis: The concept of bivariate relationship, scatter diagram, Pearson's correlation and correlation matrix. Multiple linear regression with k explanatory variables. Least Square Estimation of regression coefficients and the concept of R-square.The concept of Stepwise regression.   (9)
Introduction to Design of Experiments: Factorial Design, Robust parameter design, Nested and Split plot design.   (6)

TEXT BOOKS:
1. Miller & Freund's "Probability and Statistics for Engineers", Richard A. Johnson, 6th Edition, PHI.
2. Douglas C.Montgomery, George &C.Runger, 'Applied Statistics and Probability for Engineers', 6ed, ISV Paperback, 2016.

REFERENCE BOOKS:
1. R.E Walpole, R.H. Myers & S.L. Myers 'Probability & Statistics for Engineers and Scientists', 6th Edition, PHI.
2. Murray R Spiegel, John J.Schiller, R. AluSrinivasa, 'Probability Statistics',Schaum's Outline series.
3. K.V.S.Sarma,'Statistics Made Simple – Do it yourself on PC',Prentice Hall India, Second Edition, 2015.

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STRENGTH OF MATERIALS - II
18ME401
II Year B. Tech. (Mech) Fourth Semester

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:

1. Determination of deflection of statically determinate members and statically indeterminate members
2. Understand the concept of stability and derive crippling loads for columns.
3. Evaluation of the stresses in thin and thick pressure vessels
4. Determination of the stresses in curved beams with different cross sections
5. Understand the concept of shear centre and find the position of shear centre
6. Analyze the centrifugal stresses in rotating members.

Course Outcomes:
1. To find the deflection of statically determinate and statically indeterminate beams.
2. To find the critical load for columns with axial and eccentric axial loading
3. To calculate the stresses in thin and thick cylinders.
4. To calculate the stresses in beams of rectangular, circular and trapezoidal cross sections.
5. To calculate the position of shear centre
6. To determine the centrifugal stresses in rotating disc.

UNIT-I
DEFLECTIONS OF BEAMS : Introduction, Differential Equations of the Deflection Curve, Deflections by Integration of the Bending Moment Equation. Moment Area Method, Macaulay's Method. (9)
COLUMNS : Buckling and Stability, Columns with Pinned ends, Columns with other support conditions, Limitations of Euler's Formula, Rankine's Formula, Columns with eccentric Axial Loads, Secant formula. (6)

UNIT-II
STATICALLY INDETERMINATE BEAMS: Statically indeterminate Beams, Analysis by the differential equations of the Deflection curve, Moment Area Method. (8)
CONTINUOUS BEAMS: Clapeyron's theorem of three moments, Beams with constant and varying moments of inertia. (7)

UNIT-III
PRESSURE VESSELS: Thin Spherical and Cylindrical Pressure Vessels [Biaxial Stresses], Thick Cylinders: Lame's theory, Radial Deflection, Compound Cylinders. (7)
CURVED BEAMS : Stresses in Beams of small and large initial curvature, The Winkler-Bach theory, Stresses in Crane Hook and C-Clamp with Rectangular, Circular and Trapezoidal cross-sections. (8)

UNIT-IV
SHEAR CENTER: Bending Axis and Shear Center, Position of Shear Center, Shear flow, Shear Center of Channel section, Angle section, T- section and   I- section.   (6)
CENTRIFUGAL STRESSES: Introduction, Rotating Ring, Rotating Disc, Rotating Disc of uniform strength.   (9)

TEXT BOOKS
1. Mechanics of Materials by James M Gere.
2. Strength of materials by Sadhu Singh, Khanna Publishers

REFERENCE BOOKS
1. Advanced Solid Mechanics by L.S. Srinath
2. Strength of materials by G.H. Ryder: MacMillan India Ltd. Publishers

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APPLIED THERMODYNAMICS
18ME402
II Year B.Tech. (Mech) Fourth Semester

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:

1. To acquire the knowledge about the principle and working of various components associated with a Thermal power plant.
2. To compare the Working principles of various compressors.
3. To Analyse the different Refrigeration systems and process involved in air conditioning.

Course Outcomes:

On successful completion of the course, the student will be able to,

1. Explain the Working principles of different boilers its mountings and Accessories.
2. Understand the working of various components such as Steam nozzles, Steam condensers, steam turbines.
3. Differentiate the operation of Impulse and reaction turbines.
4. Describe the operation of centrifugal pumps, centrifugal and axial compressors.
5. Explain the working of Refrigeration systems.
6. The ability to apply Psychometric process to analyze for various air conditioning systems.

UNIT-I

STEAM BOILERS: Function, classification, working of Babcock and Wilcox boiler, Cochran boiler, Mountings & Accessories. (8)
STEAM NOZZLES: Types of nozzles, Isentropic flow through nozzles, Effect of friction, Nozzle efficiency, Critical pressure ratio and maximum discharge, calculation of throat and exitareas using Mollier diagram. (7)

UNIT-II

STEAM CONDENSERS: Jet and Surface condensers, condenser vacuum and vacuumefficiency, Condenser efficiency, Thermodynamic analysis. (4)
STEAM TURBINES: Types of steam turbines, **Impulse turbines:** pressure and velocity compounding, velocity diagrams, work output, power, blade efficiency and stage efficiency.
Reaction turbines: velocity diagrams, degree of reaction, work output, power, bladeefficiencyand stage efficiency. Governing of turbines, Overall efficiency and reheat factor. (11)

UNIT-III

RECIPROCATING AIR COMPRESSORS: Classification, Reciprocating Air compressor with out and with clearance volume, volumetric efficiency, Multi-stage compression, Effect of intercooling, optimum intermediate pressure in a two-stage compressor. (7)

ROTARY COMPRESSORS: Classification, working principle of Roots blower, Vane type compressor, Comparison of Reciprocating and Rotary compressors, Centrifugal compressor, Working and expression for Work done, Axial flow compressor, Degree of Reaction, Surging, Choking and Stalling. Comparison of Centrifugal and Axial compressor.   (8)

UNIT-IV

REFRIGERATION: Need for Refrigeration, Definitions, Methods of refrigeration, BellColeman cycle, Refrigerating effect, COP ,Vapor compression refrigeration system, Influence of various parameters on cycle performance, Vapor absorption refrigeration cycle
(7)

PSYCHROMETRY AND AIR CONDITIONING: -Introduction, Psychrometricproperties,Psychrometric chart, Psychrometric processes, Types of Air conditioning systems.
(8)

TEXT BOOKS
1. Treatise on Heat Engineering-V.P.Vasandani and D.S.Kumar, Metropolitan Book co, NewDelhi.
2. Thermal Engineering ---Rajput, LaxmiPubl, New Delhi.
3. Thermal Science and Engineering- D.S.kumar, S.K.katariaPubl, New Delhi.

REFERENCE BOOKS
1. Engineering Thermodynamics----Cengel and Boles, TMH.
2. Refrigeration and Air Conditioning -- C.P. Arora, TMH.
3. Engineering Thermodynamics—Achuthan, PHI, New Delhi

MATERIALS ENGINEERING
18ME403
II Year B. Tech. (Mech) Fourth Semester

Lectures	4	Tutorial	0	Practical	0	Credits		3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
1. To familiarize with the basic meaning of crystalline and non-crystalline materials
2. To give sound knowledge about alloys and compounds and their applications in engineering
3. To describe phase diagrams and phase transformations in binary alloys
4. To familiarize with equilibrium and non-equilibrium phase transformations in iron-iron carbide system with basic classification of steels and cast irons.
5. To describe different heat treatment routes to modify the properties of steels
6. To give an introduction to composite materials and other advanced materials.

Course Outcomes:
Upon successful completion of the course, the student will be able to
1. Describe and recommend the material type required to be selected for a specific engineering application.
2. Determine the material behavior with respect to its constituting phases.
3. Understand and calculate the phases and their relative amounts present in a given phase diagram
4. Select a suitable heat treatment or strengthening route to alter the mechanical behavior of structures made of steels.
5. Understand and compare the performance of different modern engineered materials while designing a structure.

UNIT-I

CRYSTALLOGRAPHY: Basic material properties, classification of materials, crystalline and non-crystalline materials, classification of crystals – Bravi's lattices – Packing factor and coordination number in cubic systems — Miller Indices crystal imperfections – crystal deformation – Slip and Twinning.   (10)
CONSTITUTION OF ALLOYS: Introduction to alloys and compounds, solid solutions, Hume-Rothery principles, compounds, electron compounds   (4)

UNIT-II

PHASE DIAGRAMS: Binary phase diagrams – Gibb's Phase rule – one component system, two component system, Phase transformations - isomorphous, eutectic, peritectic systems. Phase transformations in solid state: eutectoid and peritectoid systems.   (6)
STEELS AND CAST IRONS: Iron–Iron carbide equilibrium diagram and phase transformations, Cast irons: classification of cast irons   (4)
HEAT TREATMENT OF STEELS: Annealing, normalizing, hardening, tempering, age hardening, austempering, martempering and hardenability concept and experimental determination.   (6)

UNIT-III

ISOTHERMAL TRANSFORMATINS: TTT diagrams for eutectoid, hypo and hyper eutectoid steels, martensite and bainitic transformations, surface hardening – carburizing, nitriding, cyaniding, flame hardening and induction hardening.   (6)

STRENGTHENING MECHANISMS: Strain hardening, solid solution strengthening, grain refinement, dispersion strengthening.   (4)

COMPOSITE MATERIALS: Properties and applications of Particulate-reinforced composites, fibre reinforced composites, Laminar composites and metal matrix composites.
                    (6)

UNIT-IV

POWDER METALLURGY: Powder metallurgy process, preparation of powders, characteristics of metal powders, mixing, compacting, sintering, Applications of Powder Metallurgy.   (8)

ADVANCED MATERIALS: Introduction to Nanomaterials, biomaterials, non-ferrous metals and their alloys: Properties and applications. Brief study of copper and aluminium alloys.   (6)

TEXT BOOKS
1. Introduction to Physical Metallurgy - Sidney H. Avner, McGrawHill
2. Material Science and Metallurgy   - V. Raghavan, Pearson Education / PHI.
3. Material Science and Metallurgy - R. B. Choudary -Khanna Pub.

REFERENCE BOOKS
1. Material Science and Metallurgy - V. D. Kodgire, Everest Publishers
2. Nano materials – J. Dutta& H. Hofman
3. Biomaterials: an introduction – J. Park, Springer
4. Manufacturing Engineering & Technology – Kalpak Jain &Schmid, Pearson / PHI

KINEMATICS OF MACHINES
18ME404
II Year B.Tech. (Mech) Fourth Semester

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)		:	50

Course Objectives:
1. To understand the fundamentals of kinematics.
2. To understand the concept of machines, mechanisms and related terminologies.
3. To calculate mobility (number of degrees-of-freedom). Enumeration of rigid links and types of joints within mechanisms.
4. To make the students become familiar and understanding of the most commonly used mechanisms (4-bar, 6-bar linkages, and cams).
5. To understand the concept of synthesis and analysis of different mechanisms.
6. To understand the Principles and working of various straight line motion mechanisms
7. To analyze a mechanism for displacement, velocity and acceleration at any point in a moving link which is prerequisite for dynamics of machines.
8. To analyze Steering gear mechanisms and working of hooks joint
9. To understand the working principles in Belt and chain drives
10. To understand the theory of gears, gear trains and cams

Course Outcomes:
1. Upon Completion of the course student will be able to develop critical thinking and problem solving capacity of various mechanical engineering problems related to kinematics of machines.
2. The student should be able to employ various concepts of mechanisms like straight line motion mechanisms, Steering gear mechanisms and working principles of Gears, gear trains, Cams, Belt and Chain drives and design related problems effectively.
3. The student should be able to employ analytical, mathematical and graphical aspects of kinematics of Machines for effective design.

UNIT-I
INTRODUCTION : Mechanisms and machines, Rigid and resistant bodies, Link, Kinematic pair, Degrees of Freedom, Classifications of Kinematic pairs, kinematic-chain, Linkage, Mechanism, and structure, Classification of mechanisms, Equivalent Mechanisms, Four - Link (bar) Mechanism, Inversions of Slider - Crank Chain, Double – Slider Chain.   (7)
VELOCITY ANALYSIS: Introduction, Absolute and Relative Motion, Vectors, Addition and subtraction of Vectors, Motion of a Link, Four Link Mechanism, Angular Velocity of Links, Velocity of Rubbing, Slider - Crank Mechanism, Crank and Slotted Lever Mechanism.
(8)
UNIT-II
Instantaneous centre, Notation, Number of I - Centres, Kennedy's theorem, Locating I - Centres, Angular velocity by I - Centre Method.   (5)
ACCELERATION ANALYSIS : Acceleration, Four-Link Mechanism, Angular acceleration of Links, Acceleration of Intermediate and offset points, slider-Crank Mechanism, Coriolis acceleration component, Crank and slotted lever Mechanism. (10)
UNIT-III

KINEMATIC SYNTHESIS: Stages of synthesis-Concepts of type, Number and dimensional synthesis - Tasks of dimensional synthesis, Concepts of function generation, Rigid body guidance and path generation, Freudenstein equation for function generation using three precision points. (7)

CAMS : Introduction, Types of cams, Types of Followers, Definitions, Graphical synthesis of cam profile.(Knife Edge, Roller and Flat faced Followers). (8)

UNIT-IV

GEARS : Introduction, Classification gear terminology, Law of Gearing, Velocity of Sliding, Forms of Teeth, Cycloidal Profile Teeth, Involute Profile Teeth, Path of contact, Arc of contact, Number of pairs of Teeth in contact, Interference in Involute Gears, Minimum number of Teeth, Interference between Rack and Pinion, Undercutting, Comparison of Cycloidal and Involute tooth forms. (8)

GEAR TRAINS: Introduction, simple Gear Train, Compound Gear Train, Reverted Gear train, Planetary or Epicyclic Gear Train, Analysis of Epicyclic Gear Train, Torques in Epicyclic Trains. Tabular and Algebraic Methods. (7)

TEXT BOOKS
1. Theory of Machines of by S.S.Rattan. TMH.
2. Theory of Mechanisms and Machines by C.S.Sharma, KamleshPurohit, PHI

REFERENCE BOOKS
1. Theory of Mechanisms and Machines by Ghosh and Mallik
2. Mechanism and Machine Theory by J.E. Shigley

TECHNICAL ENGLISH
18EL002
II Year B.Tech. (Mech) Fourth Semester

Lectures	3	Tutorial	0	Practical	0	Credits	2
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)		:	50	

Course Objectives:

The course aims
1. At enhancing the vocabulary competency of the students
2. To enable the students to demonstrate proficiency in the use of written English, including proper spelling, grammar, and punctuation
3. To introduce corrective measures to eliminate grammatical errors in speaking and writing
4. To enhance theoretical and conceptual understanding of the elements of grammar.
5. Understand and apply the conventions of academic writing in English
6. To enhance the learners' ability of communicating accurately and fluently

Course Outcomes:
By the end of the course the student will be able to

1. Build academic vocabulary to enrich their writing skills
2. Make use of contextual clues to infer meanings of unfamiliar words from context
3. Produce accurate grammatical sentences
4. Skim for main idea(s) & can for details
5. Distinguish main ideas from specific details
6. Identify author's purpose and tone
7. Make inferences and predictions based on comprehension of text
8. Discuss and respond to content of the text in writing
9. Produce coherent and unified paragraphs with adequate support and detail

UNIT-I
1.1 Vocabulary Development: Familiarising Idioms & Phrases
1.2 Grammar for Academic Writing: Making Requests
1.3 Language Development: Using Transition & Link words
1.4 Technical Writing: Letter Writing & Email Writing

UNIT-II
2.1 Vocabulary Development: Analogous words, Gender Sensitive language
2.2 Grammar for Academic Writing: Tenses: Simple Past /Present Perfect, The Future: Predicting & Proposing
2.3 Language Development: Cloze tests
2.4 Technical Writing: Technical Reports

UNIT-III
3.1 Vocabulary Development: Abbreviations& Acronyms
3.2 Grammar for Academic Writing: Describing(People/Things/Circumstances) : Adjectival & Adverbial groups
3.3 Language Development: Transcoding (Channel conversion from chart to text)
3.4 Technical Writing: Circular, Memos, Minutes of Meeting

UNIT-IV
4.1 Vocabulary Development: Corporate vocabulary

4.2 Grammar for Academic Writing: Inversions & Emphasis

4.3 Language Development: Reading Comprehension

4.4 Technical Writing: Resume Preparation

REFERENCE BOOKS

1. Communication Skills, Sanjay Kumar &PushpaLatha. Oxford University Press: 2011.
2. Technical Communication Principles and Practice. Oxford University Press: 2014.
3. Advanced Language Practice, Michael Vince. MacMilan Publishers: 2003.
4. Objective English(Third Edition), Edgar Thorpe &Showick. Pearson Education:2009
5. English Grammar: A University Course (Second Edition), Angela Downing & Philip Locke, Routledge Taylor & Francis Group: 2016

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE
18ME405
II Year B.Tech. (Mech) Fourth Semester

Lectures	2	Tutorial	0	Practical	0	Credits	0
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)		:	50	

Course Objectives:
1. The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian traditional knowledge systems connecting society and nature.
2. Holistic life style of Yogic-science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions.
3. The course focuses on introduction to Indian knowledge system, Indian perspective of modern scientific world-view and basic principles of yoga and holistic healthcare system.

Course Outcomes:

1. Ability to understand, connect up and explain basics of Indian traditional knowledge modern scientific perspective.

Course Content:

- Basic Structure of Indian Knowledge System (i) वेद, (ii) उपवेद (आयुर्वेद, धनुर्वेद, गन्धर्वेद, स्थापत्य आदि) (iii) वेदांग (शिक्षा, कल्प, निरुत, व्याकरण, ज्योतिष छंद), (iv) उपाइग (धर्म शास्त्र, मीमांसा, पुराण, तर्कशास्त्र)

- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case Studies.

TEXT BOOKS/REFERENCE BOOKS
1. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course material, BharatiyaVidyaBhavan, Mumbai, 5th Edition, 2014.
2. Swami jitatmanand, Modern Physics and Vedant, BharatiyaVidyaBhavan.
3. Fritzof Capra, tao of Physics.
4. Fritzof Capra, The wave of life.
5. V N Jha(Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay Foundation, Velliarnad, Amaku, am.
6. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkatta.
7. G N Jha, (ENG. Trans.), Ed. R N Jha, Yoga-darshanam with VyasaBhashya, VidyanidhiPrakasam, Delhi, 2016.
8. R N Jha, Science of consciousness Psychotherapy and yoga practices, Vidyanidhiprakasham, Delhi, 2016.
9. P R Sharma (English translation), ShodashangHridayam.

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PROBABILITY AND STATICSTICS LAB
18MAL01
II Year B. Tech. (Mech) Fourth Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:
At the end of course students will able to :

Course Outcomes:

Syllabus

1. Introduction to R-Programming

2. Inputting data with EXCEL

3. Importing Data into R from EXCEL or other format

4. Distributions – development and Interpretation

5. Hypothesis Testing

    a. Using EXCEL
    b. Using R-programming

6. ANOVA applications – industrial experiments

7. Regression Experiments

8. Factorial Design Experiment

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PNEUMATIC AND HYDRAULIC DRIVES LAB
18MEL41
II Year B. Tech. (Mech) Fourth Semester

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:

1. This lab provides the student with the basic knowledge concerned with the function, process, and applications of the hydraulic, pneumatic, electro pneumatic and electro hydraulics.
2. The student should recognize the importance of hydraulic and pneumatic components and their functions.
3. The students should understand the devices used in generation, transmission and control of hydraulic and pneumatic drives.

Course Outcomes:

Upon successful completion of this laboratory course student should be able to:

1. Understand the main components of hydraulic and pneumatic systems.
2. Understand energy conservations in hydraulic, pneumatic, electro pneumatic and electro hydraulic systems and also make the devices used in generating the hydraulic and pneumatic power and how to transmit and control energy.

LIST OF EXPERIMENTS

Pneumatics

1. Direct control, indirect control and speed regulation of a double acting cylinder.
2. Displacement, pressure and time dependent control of a double acting cylinder.
3. Basic circuits with AND function, OR function and electric latching.
4. Sequential control of 2 double-acting cylinders without overlapping signals.
5. Sequential control of 2 double-acting cylinders with impulse valves and signals overlapping.

Hydraulics

1. Pressure intensification and flow characteristics of a single rod cylinder.
2. Characteristics of a Hydraulic motor.
3. Application of a check valve with manual and pilot operations.
4. Working of an adjustable throttle valve.
5. Characteristics of a Hydraulic accumulator.

References:

1. Practice for professionals pneumatics trainee's manual- BOSCH-REXROTH.
2. Practice for professionals electro pneumatics trainee's manual- BOSCH-REXROTH.
3. Project manual on industrial hydraulics- BOSCH-REXROTH.

Quotations for the Students

- Concerned about Environment: If you plan for 1 year -*Plant rice*; If you plan for 10 years - *Plant trees*; If you plan for 100 year - *Educate people*

- All great leaders are great readers

- Knowledge is a treasure but practice is the key to it

- Be a light, not a judge. Be a model not a critic. Be part of the solution, not part of the problem

- Self-trust is the first secret of success

- Success is a journey not a destination

- There are no shortcuts for success. The only route is hard work

- There is nothing impossible because the word says itself I am possible

- Reading is to the mind what exercise is to the body

- Obstacles are great incentives

- Imagination is more important than knowledge

- An ounce of knowledge is more precious than tons of gold

- The one who wants to climb the ladder, must begin at the bottom

- Happiness is a habit - cultivate it

- Ability will get you success, Character will keep you successful

ADMINISTRATIVE & LIBRARY BLOCK

RESEARCH PARK

CIVIL & MECHANICAL BLOCK

LADIES HOSTEL

GENERAL ENGINEERING BLOCK

GUEST HOUSE

Bapatla Engineering College (Autonomous)

(Approved by AICTE, under the jurisdiction of Acharya Nagarjuna University, Guntur)
Thrice Accredited by NBA
Mahatmajipuram, GBC Road, Bapatla-522102,
Guntur District, Andhra Pradesh